

# The Iron Age

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A Review of the Hardware, Iron and Metal Trades.

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## Evading the Interstate Law by Under-Billing.

According to the *National Car-Builder* there is every reason to believe that the working of the Interstate law has in some quarters led to the systematic under-billing of freight. There is said to be more ways of killing a cat than by choking it with butter, and the freight agents appear to recognize the fact that there are more ways of favoring shippers whose patronage they are willing to cultivate by law breaking than by giving them the forbidden rebates on freight charges. Giving rebates on freight charges was an awkward method of favoring the large shipper at the expense of the smaller one, but it was not open to some of the disadvantages of under-billing. The men who attended to the giving of illegal rebates might receive training in dishonesty that would be likely to bear evil fruit in its season; but the practice would scarcely be more demoralizing than that of daily

pounds. The shell, with its conical head, is all in one piece, being forced into shape by a heavy hydraulic ram. The drawing of the shell was witnessed by Lieutenant Zalinski and G. H. Reynolds, consulting engineer of the Pneumatic Dynamite Gun Company. The shell is intended to carry 600 pounds of explosive gelatine, shells carrying 55 pounds only having been used in the recent experimental trial in New York Harbor, when a small vessel was demolished at a distance of a little over a mile.

## A Successful Smoke Preventer.

The progressive citizens of Chicago—those who are anxious that the city shall in all respects be made a desirable place of residence—have been endeavoring for years to abolish the smoke nuisance accompanying the careless use of soft coal. Of course the greatest source of annoyance in this respect is the burning of soft coal for raising steam.

who were sincerely seeking a good smoke consumer, that for the past 15 years he has had in use a smoke-consuming apparatus which does consume smoke. It is known as the Woodson patent, but is now open to the use of anybody without royalty, as the patent ran out last year. It is described as being very simple in its arrangement. A boiler-plate drum 18 inches in diameter runs horizontally through the furnace from side to side about 12 inches above the grate and 2 feet from the doors of the furnace. The space above the drum to the boiler is bricked up so that the smoke and heat generated in front of the drum must pass down under the bed of fire and under and in rear of the drum in order to find its way to the flue in the rear, and the smoke, in passing through the fire, is absolutely consumed and destroyed. The coal is first thrown in the front, where it is coked and all smoke eliminated, after which it is shoved under the drum into the back furnace with iron bars and fresh coal is fed in

in favor of this consumer is that it costs but \$150 and can be attached to any furnace without requiring a change of boilers or the remodeling of the entire furnace.

## Is the Condition of Laborers Growing Worse?

It is a common complaint not only among labor agitators, but among others who should know better, that "the rich are growing richer and the poor are growing poorer," and that the rewards of labor are growing less. Some rich men are undoubtedly growing richer, but are the working classes growing poorer? This question was well answered by James Bartlett, a Massachusetts machinist, in an address at the Michigan semi-centennial on the progress of machinery in the last 50 years. Speaking from memory he said: "The wages of a machinist in shops, in 1843, were \$1 to \$1.25 a day; one nabob of a pattern-

## Universal Boring, Drilling and Milling Machine.

One of the most interesting and noteworthy tools now in the machine shops of the Brooklyn Navy Yard is a heavy universal boring, drilling and milling machine, designed and built by the Niles Tool Works, of Hamilton, Ohio. During a recent visit to the Navy Yard we were furnished with an opportunity to examine the machine in detail, and are enabled now, through the courtesy of the builders, to lay before our readers a number of engravings, which give a very fair idea of the nature of the design. We should here direct attention to the fact, however, that the two perspective views and the elevation and plan do not agree in some minor points, this being due to the fact that the machine was somewhat modified in design after the blue prints with which we were furnished had been made. Figs. 1 and 2, on the other hand, were made from photographs of the finished tool.

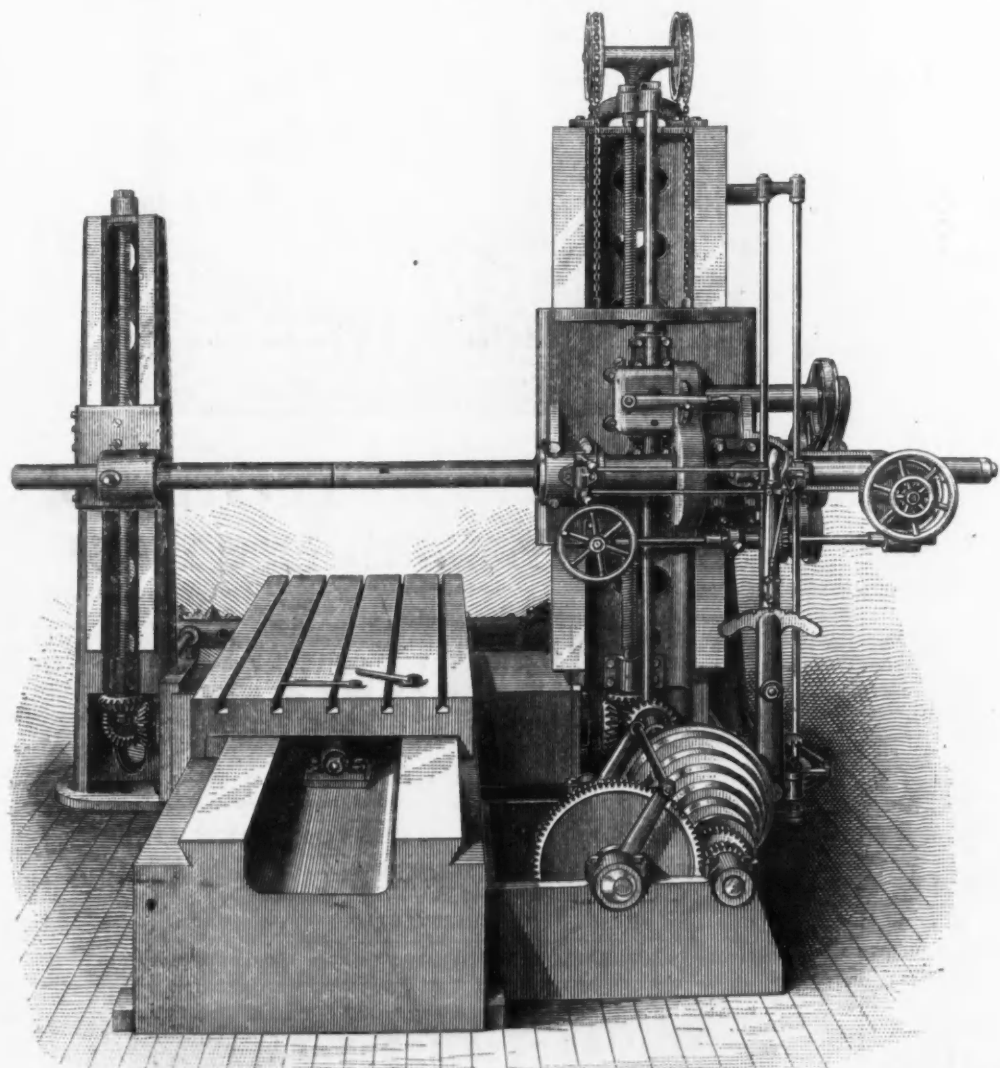


Fig. 1.—Front View.

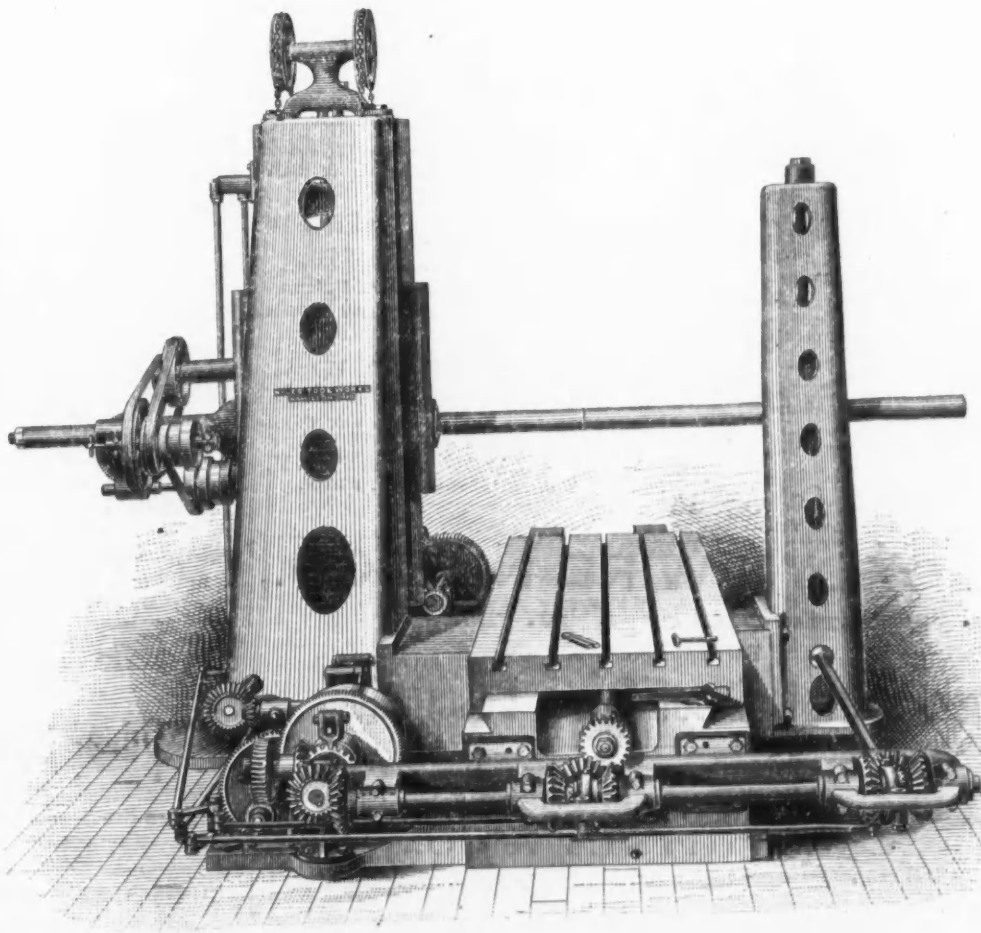


Fig. 2.—Rear View.

(For Elevation and Plan, see pages 16 and 17.)

UNIVERSAL BORING, DRILLING AND MILLING MACHINE AT THE BROOKLYN NAVY YARD, BUILT BY THE NILES TOOL WORKS, HAMILTON, OHIO.

making the false representation that a ton was only 1000 pounds or less. The latter practice also entails a cause of danger from which the former was free. Cars are liable to be so overloaded that dangerous accident will result. We recently learned particulars of a case where the axle of a car broke, causing considerable damage. The car was billed to contain 23,000 pounds, and the actual load was found to be 38,000 pounds. This is too great a difference between the pretended and the real load, which indicates that the men who are engaged in this means of cheating are blunderers in the art they are cultivating. Railroad managers ought to see to it that general freight agents who undertake to beat their competitors by under-billing do not get the companies they represent into serious trouble. For instance: A car is stenciled to carry 30,000 pounds, which is implied to be the safe load. To meet the plan of under-billing, a load of 50,000 pounds is put into the car, and before it reaches its destination an axle breaks, killing one or more trainmen. When this or a similar case happens, and it will come in time if the practice is persisted in, some one will be liable to be tried for manslaughter. It is a pity some one could not be convicted of murder.

A Large Shell for the Dynamite Gun.—Brown & Bros., of Waterbury, have completed the shell for a projectile of enormous size for the dynamite gun to be used on the new cruiser now being built for the Government. It is a seamless drawn brass shell, 6 feet 8 inches long, 14 inches inside diameter,  $\frac{1}{4}$  inch thick, and weighs 200

In the hope that a considerable part of this annoyance could be checked they succeeded in persuading the City Council to enact a stringent ordinance declaring the production of smoke a nuisance, punishable by fine, and authorizing the appointment of a Smoke Inspector to note infractions of the ordinance and proceed against the offenders. Since the adoption of this measure a succession of incumbents of the office has endeavored, with more or less zeal, to grapple with the problem. Smoke preventers without number have been brought forward by enthusiastic inventors, who have induced well-disposed citizens to introduce them in their desire to comply with the city regulations and also to avoid the penalty imposed for producing smoke. So many of these devices, however, have shown themselves to be partial failures, or actually injurious to steam boilers, that they have been abandoned after a short trial, and the users have become convinced that smoke consumers generally are "no good." The present smoke inspector of Chicago, after spasmodic attempts to exercise his official duties, seems to have become impressed with this view of the case also, and in recent interviews with daily newspaper reporters, he has spoken very discouragingly of the prospects of the success of the anti-smoke movement. His assertions of the failure of all smoke consumers, however, were hardly in print before they were directly contradicted by Edwin Lee Brown, of Brown Bros. Mfg. Company, whose factory for the production of sidewalk lights is located on the corner of Clinton and Jackson streets.

Mr. Brown stated, for the benefit of the public generally and in the interest of those

its place. With fine coal a little smoke can be detected coming from the chimney at the time of firing, but with coarse coal it does not smoke at all. This drum is supplied with hot water from two 5-inch circulating pipes, one on each side of the boiler on the outside and connected with the ends of the drum through the walls of the boiler. The water is fed into these pipes from the mud-drum in the rear of the boiler. From the large drum in front there is a 6-inch connecting pipe with the boiler through which the water passes, keeping it constantly in circulation, and thereby making the drum not only a means of heating the water but a generator of steam. The purpose of the drum running through the bed of burning coal is simply to shut out the smoke of the front or coking furnace from the rear furnace, which connects directly with the flue and chimney; the water is introduced to the drum for the purpose of preventing its burning.

The cheapest Illinois soft coal is used in this furnace, costing only \$2.65 per ton delivered at the works, but the chimney is as guileless of smoke as though the purest anthracite was being consumed. The boilers are 5 x 16 feet, supplying power to a 20 x 48 inch engine and heat to a 4-story building 90 x 100 feet, and but  $2\frac{1}{2}$  tons of this cheap coal are required per day. It is sufficiently shown that all smoke is consumed from the fact that the flues of the boilers are cleaned but once a week, and then not  $\frac{1}{4}$  inch of soot is found in them, while in furnaces not using a smoke consumer the flues of the boiler require to be cleaned every day and are always found heavily clogged with soot. A strong point

maker received the great sum of \$1.50. They went to work at 5 o'clock in the morning and worked till 7:30 at night, with an hour for breakfast and three-quarters for dinner. It was several years before we obtained 11 hours a day. It has now been 10 hours a day for 25 years or more, and we grumble at that, though we may get more than twice the wages we did 40 years ago; and we are hoping to get the same or higher pay for working eight hours. I know the condition of the machinist is better than it was when I first joined the guild; he has better pay, better houses, better education, better living; and I hope he will keep on improving for the next 50 years. Large machine shops were started before 1836; one in Lowell employed over 1000 men on cotton machinery. Now, the country is dotted with them. For my part, I do not want any more of the good old times. The present time is the best we have ever had, though I hope not the best we shall ever see. In 50 years we have reduced our hours of labor from 14 to 8 hours a day; our wages are doubled, and the necessities of life are much cheaper (a barrel of salt, which cost \$3.50 years ago, has been sold in Michigan for 75 cents). The great curse of drunkenness is very much diminished. We live in better houses, better warmed and lighted, and we are better clothed; a high-school education is within reach of every child; books are free to all; the poorest laborer, who meets with an accident in our streets, receives surgical aid that no king could purchase 50 years ago, and our great railroads distribute the fruits of labor so that famines are impossible."

The machine was built specially for boring and drilling holes in large and heavy pieces of work, and the movements to be provided were: 1, Longitudinal adjustment of the table to any desired position with the work clamped upon it; 2, Vertical adjustment of the saddle carrying the boring bar or spindle to any desired height; 3, Revolving motion and feed to the boring spindle suitable for any diameter of bore within the range of machine—all of the above movements to be effected by power. Figs. 1 and 2 on this page represent respectively front and rear views and show the general construction. The bed, which is 18 feet long, carries a table measuring 12 feet by 3 feet 5 inches. This table has a traverse of 10 feet on the bed and is moved by a screw underneath, operated by power.

Against the side of the bed is firmly bolted the main column A (see Figs. 3 and 4 on pages 16 and 17) of large section, 32 inches wide on the face and 10 feet high. The saddle carrying the boring spindle G is 40 inches square, and has a vertical adjustment of 60 inches on the face of the column. It is balanced by a counter-weight hanging in the body of the column, and is moved up and down by a heavy screw operated by power. Against the opposite side of the bed is bolted an auxiliary column, having on its face the outboard bearing for the boring bar G, adjustable vertically by a screw B. This screw is connected to the saddle screw by a shaft, C, and bevel gearing causing both screws to revolve with equal velocities, and maintaining the boring bar always parallel with the top surface of the table.

(Concluded on Page 16.)



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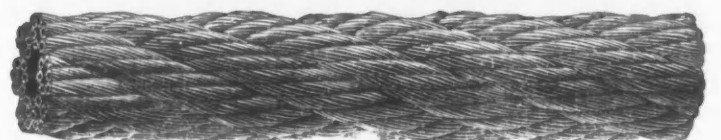
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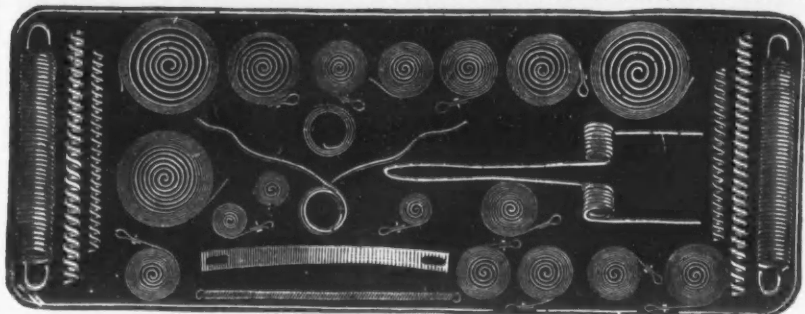
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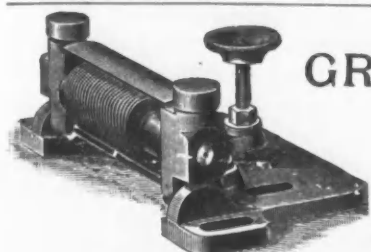
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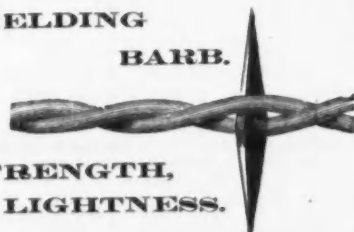
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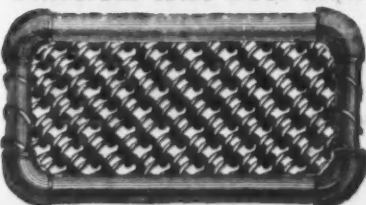
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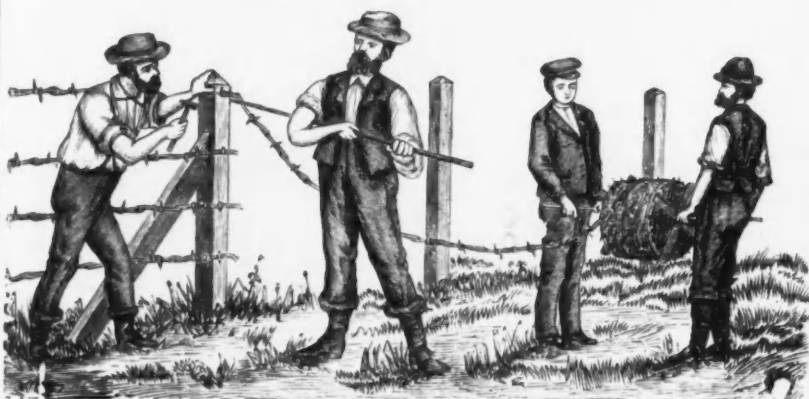
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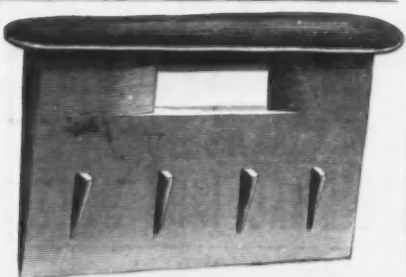
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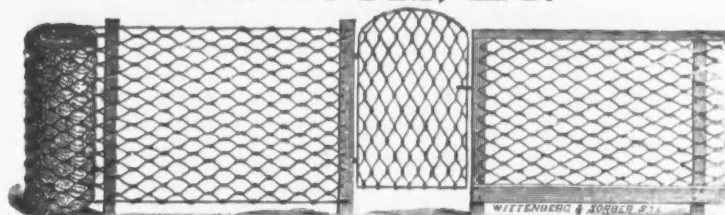


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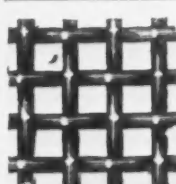
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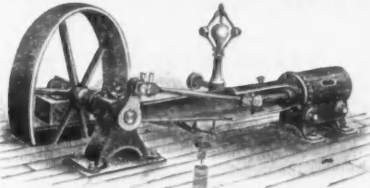
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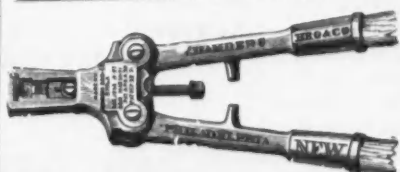
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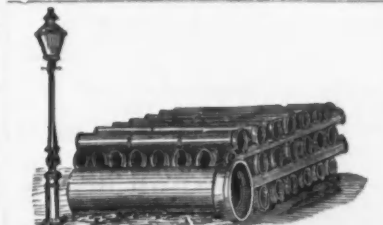
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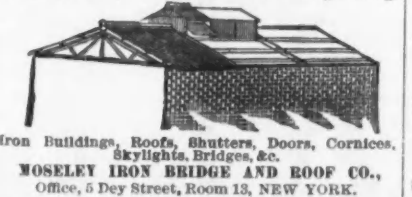
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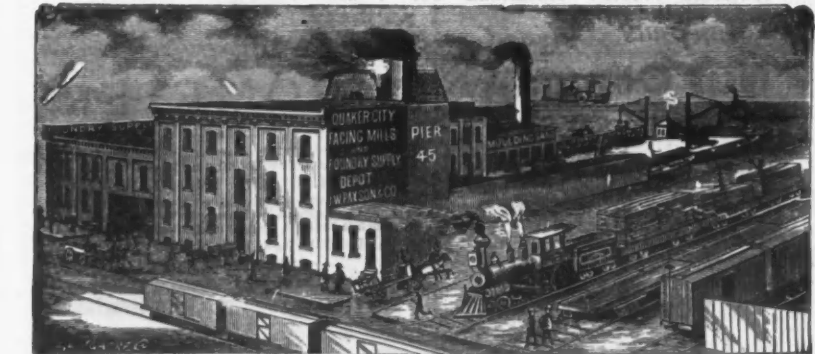
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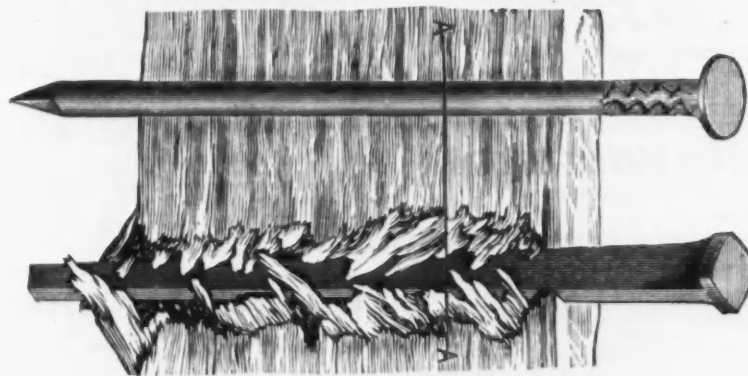
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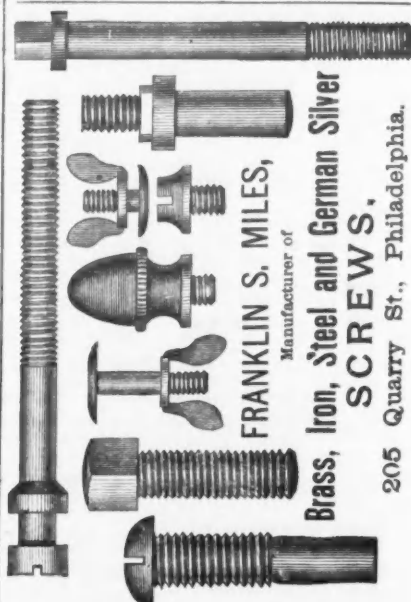
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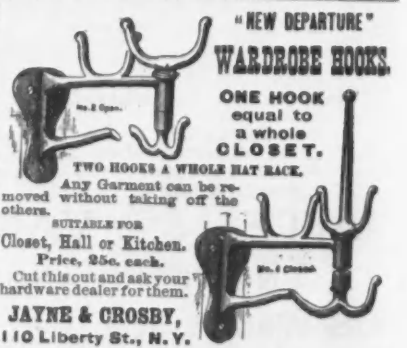
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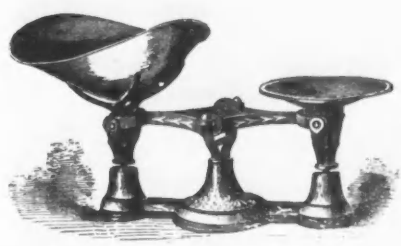
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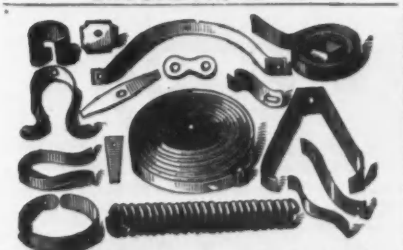
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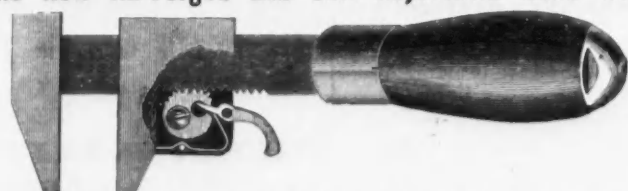
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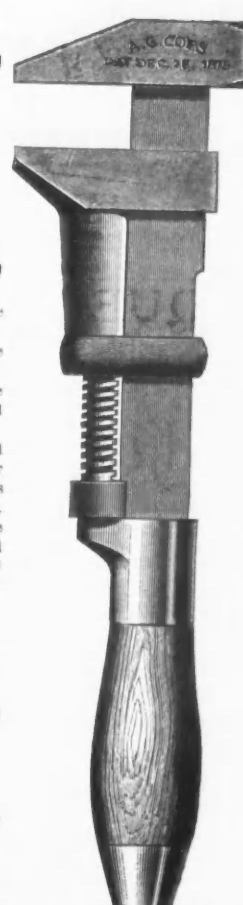
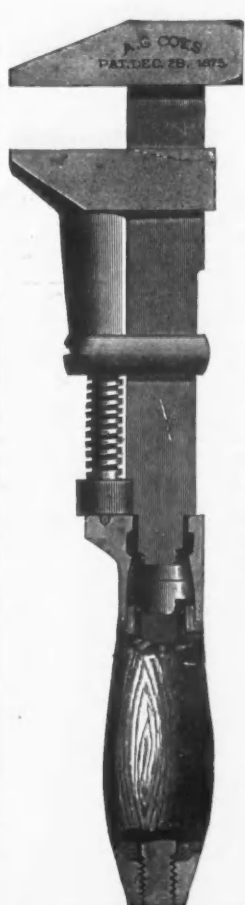
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The serrated jaw of the Wrench are interchangeable; that is, the same serrated plate may be used for either the stationary or sliding jaw, so that if one plate is broken another can be furnished adapted to either jaw without express designation. The slides, nuts and various parts are also interchangeable, thus easily repairing the Wrench at very small expense, and with as perfect practicality for further use as when the Wrench was new.

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WITH MUD SCRAPER ATTACHED.



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WILL OUTLAST A DOZEN OF ANY OTHER KIND.

This DAUBING BRUSH is made WITH A SCRAPER FOR REMOVING MUD FROM THE CREVICES OF THE SHOES. The utility of this is too apparent to need a word of commendation.

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This is a new departure in adjustable screens and is free from many objections found in others. It is the **only double face screen**, and **equally well finished on both sides**. It has a **box panel**, and can be adjusted **without the friction** noticeable in all other adjustable screens. This screen is made either of soft or hard wood, and stained imitation black walnut, cherry, or finished in natural wood, as desired.

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**WEYMOUTH'S PATENT.**

This Knife is the **BEST IN USE** for cutting down hay and straw in mow and stack cutting fine feed from bales, cutting corn stalks for feed, cutting peat & ditching marshes. The blade is **Best Cast Steel**, spring temper, easily sharpened, and is giving universal satisfaction. A few moments' trial will show its merits, and parties once using it are unwilling to do without it. Its sales are fast increasing for export as well as home trade, and it seems destined to take the place of all other Hay Knives. They are nicely packed in boxes, 1 dozen each of 60 pounds weight, suitable for shipping by land or water to any part of the world.

Manufactured only by  
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 For sale by the Hardware trade generally.

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We are informed that various parties are infringing upon the widely-known Letters Patent granted originally to GEORGE F. WEYMOUTH for an improved Hay Knife. The invention patented to GEORGE F. WEYMOUTH is embodied in a sword-shaped blade provided with operating handles for working the same, the edge of the sword-blade being furnished with knife-edged serrations or teeth. **IT IS OUR PURPOSE TO PROSECUTE ALL INFRINGEMENTS**, and to hold responsible to the full extent of our ability and of the law all parties who manufacture any knife infringing upon the patent, or who deal in the same. Several suits are now pending in the U. S. Courts. **ALL MANUFACTURERS AND DEALERS** are hereby warned of our rights, and the public are cautioned against purchasing any Hay Knives made as described above, which are not of our genuine manufacture.

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**W.H. CARTER'S PATENT NEEDLE HAY KNIFE.**

PAT. APR. 29, 1884.  
 IMPROVED BY M.M. BARTLETT.  
 Improvement Patented April 28, 1885.

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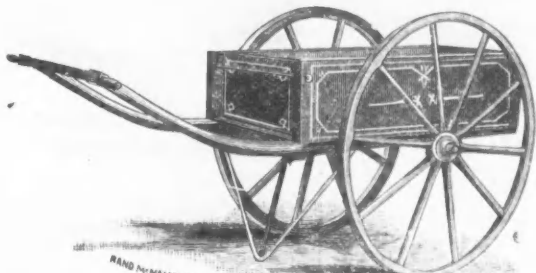
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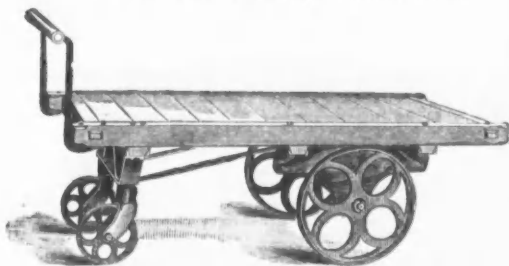


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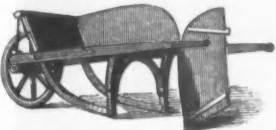


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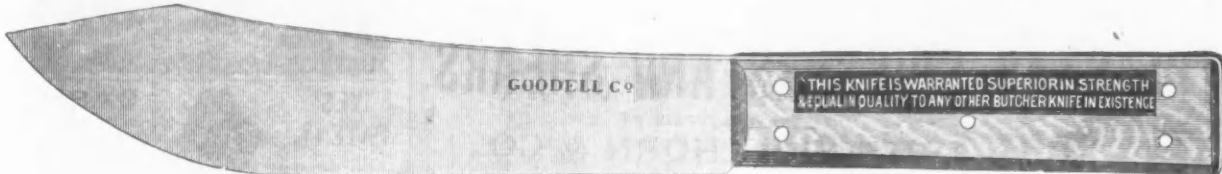
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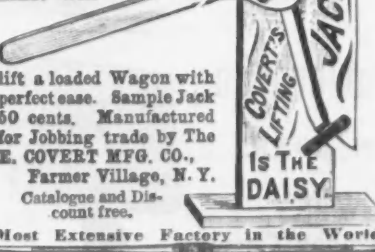
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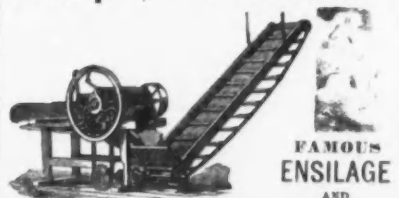
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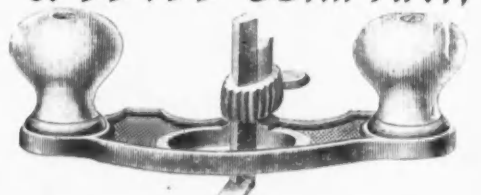
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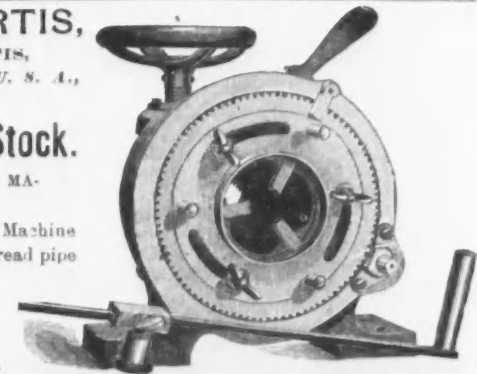
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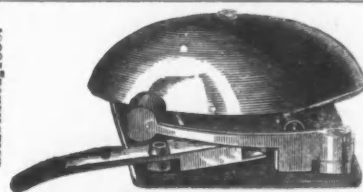
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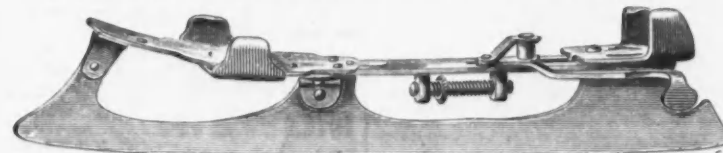
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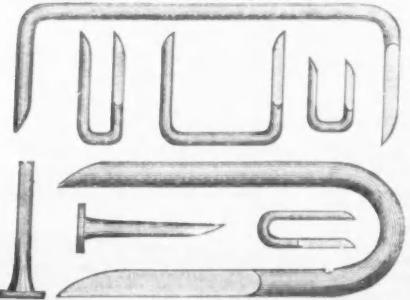
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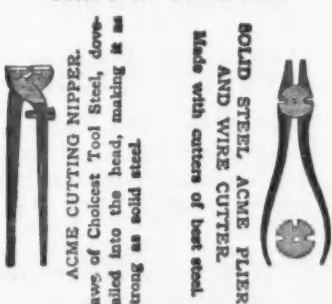
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893	- - -	3 "

### WITH STEEL SHACKLE.

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### The Strong Locomotive.

From an interesting lecture on the Strong locomotive delivered last Thursday evening by Mr. Geo. S. Strong before the Society of Arts, at the Massachusetts Institute of Technology, Boston, Mass., we extract the following:

In America the fastest runs are on the New York Central from New York to Buffalo—440 miles in 10 hours 45 minutes, or at the rate of 40.93 miles per hour, with only three stoppages and with favorable grades. On the P. R. R. the limited runs from Jersey City to Pittsburgh, 443 miles, in 11 hours 17 minutes at an average speed of 39.27 miles, with three stoppages. This same road between Jersey City and Washington runs a train the 226.7 miles in five hours two minutes, corresponding to 45.04 miles per hour. The fastest run between any two stopping places is that on the B. & O. between Washington and Baltimore, where a distance of 40 miles is covered in 45 minutes, and this corresponds with the English run between Manchester and Liverpool of 36 miles in 40 minutes. Both these runs are about 53 1/2 miles per hour. Other fast English runs are, London and Edinburgh 401 miles in nine hours by the G. N. R., or 44 1/2 miles per hour. The same line runs trains from Manchester to London 205 1/4 miles in four hours and ten minutes, at a speed of nearly 49 1/2 miles, and only two stoppages are made. Certainly between stops a speed of over 60 miles is often obtained, but an average running speed of 60 miles is nowhere obtained, and all high speeds are usually with quite light trains. The causes of this are not far to seek, and may be found in the boiler and about the valve gear.

First, the boiler. It is by no means impossible with a rectangular fire-box to obtain as large a fire grate as may be desired, but this is done at the expense of safety. The flat-sided box with its multitude of screwed stays is not a scientific form of construction, but one which contains the elements of self-destruction, as the thousands of broken stays constantly testify. Hence, as regards the boiler, there is required some structure providing a larger grate area than hitherto has been safely employed and constructed on recognized safe and scientific principles, and modern practice calls also for higher pressures, and for such high pressure any boiler to be a success must be safely suitable. A flat surface exposed to pressure is the very worst form in which material can be disposed, and stays are thus simply an expedient for holding up to their work surfaces of metal which should not be found in a steam boiler, for in such a surface the stresses are transverse, and a thin plate is as unsuited to resist a transverse stress as is a very shallow truss to carry a great weight. Deflection must take place, and to prevent this, the stays are employed and add very greatly to the weight of the boiler as well as to its cost, and, after all, are but an unscientific makeshift. Second, the valve gear. Supposing that a full supply of steam is available from the boiler, it is impossible to obtain the power from the engine which could be obtained from, say, a Corliss engine at equal speed and steam pressure; when at high speed and with steam blowing at the safety valves there appears to be something which holds back the engine. It is not the slipping of the wheels, for it is not found that wheels do slip at high speeds. It is not that the cut-off in the cylinder is too early or too late, for any variation from a certain position of the reverse lever only lessens the speed. The fault is one that is inherent in the common link motion—namely, excessive compression.

Over compression may be remedied somewhat by an increase in the clearance spaces of the cylinder and passages, but such an increase would be wasteful. The fact of the existence of this excessive compression is, however, a bar to any attempt to reduce clearances, and is therefore a fault to be removed. The claim that compression is an aid to economical working is true in a sense, but there is no necessity for an excess in an otherwise good feature. The great evil of excessive compression is the enormous reduction which it makes in the power of the locomotive at high speed. Deprived of perhaps a third or more of its proper tractive power the engine cannot attain a high speed with a heavy load. Quite apart from the question of small consumption of coal per horse-power is the question of the general efficiency of a locomotive. If an engine is sufficiently heavy to start a certain train from rest and draw it at a moderate speed it may have a mean cylinder pressure at late cut off about equal to its adhesion on the rail. At a high speed, however, the adhesion of the engine is very much in excess of the cylinder tractive power, and hence a great amount of useless weight has to be transported. If, however, the cylinder tractive power is doubled by an improvement in the valve gear we should still at high speeds have a sufficient adhesion to draw double the load, and we should still haul with one engine and two men a load which would pay double freightage for the same wage expenditure. It is apparent, then, that we may lose more by striving after economy of fuel per horse-power than by seeking to increase the attractive power at speed per pound weight of machinery. The question of efficiency per pound weight of motor has been far too little studied, and it will be acknowledged that the engine which secures this efficiency, and does so without loss of economy, is a machine worth some consideration, and such is the Strong locomotive. Various types of valves have been tried with the object of securing better admission and exhaustion of steam, but they do not reduce the compression, which is a fault of the link mechanism rather than of the valve, and balanced valves have been actually known to consume 10 per cent. more steam than plain valves, owing probably to leakage.

To run a heavy train at high speed requires a large power, and this implies a high mean cylinder pressure and a continuous and well sustained steam supply. We will show how they have been obtained in the Strong locomotive. It is scarcely necessary to remark here that in order to properly consume coal there must be provided means for the proper admixture of air

with the gases from the fuel, and that, when mixed, time must be allowed for combustion to complete itself. Within the fire box shell are two furnaces, which together give a grate surface about three times that of ordinary locomotives. The large area of grate renders possible a lighter blast, so that the fire is not torn up. A too fierce blast draws unconsumed particles of coal through the tubes and smoke-box, and frequently chokes the tubes and overheats the smoke box, causing the doors to spring and draw cold air. Too strong a draft also may produce bare spots on the grate, which allow the rush of volumes of air, which serves no useful purpose when thus admitted and only causes waste. The further advantage of a gentle blast is the reduction in the back pressure on the piston. Beyond the furnaces is a separate combustion-chamber, in which combustion is completed before the gases are quenched in the small tubes.

The furnaces are of corrugated steel, so as to form a series of compound arches giving immense resistance against a collapsing pressure when rolled into cylinders, and are for all practical purposes indestructible, having been proved capable of resisting a pressure of 1100 pounds per square inch. The furnaces are united by a junction piece or "breeches" to the combustion-chamber, also of corrugated steel. The various riveted junctions lying in the path of the flame from the fires are of the form known as the Adamson flanged seam, a form which provides that no rivet shall be exposed to the action of fire, so insuring durability and tightness. This form of furnace joint is now almost universal in English boiler practice, and its excellence has stood the test of 30 years. By employing the circular form we are able to dispense with all stays and rid our boiler of the most expensive and least durable portions of the usual practice. In the forward end of the combustion-chamber is fixed the tube plate, beyond which point the general characteristics of the boiler are the same as those of the ordinary locomotive. The tube plate is the only flat portion exposed to external pressure, and as the greater part of its area is occupied by the tubes it may be said that all parts of the furnace, &c., are of the natural circular form which is suited to withstand pressure without the brute resistance of stud and roof bar stays, palm and crowfoot bars, &c., which are necessary to keep the rectangular fire-box up to its work. The importance of this can only be recognized by those who can properly appreciate the difference between a cold boiler and one hot and under high steam pressure. In the cold boiler all is dead and motionless. In the hot boiler a constant expansion motion is taking place, which arches up the furnace crowns, lengthens one part more than another less highly heated, and generally sets up a completely different set of conditions, which if not provided for, will, from the commencement, begin to effect the destruction of the boiler, from overstraining, grooving, &c. We have in this boiler endeavored to avoid all transverse stress and trusted to the direct tensile and compression strength of the material. Turning to the outer shell, the barrel of the boiler, beyond being like the furnace and combustion-chamber welded at all longitudinal seams, presents no material points of difference from the ordinary boiler, but back of the barrel the difference is very great. In place of the flat-sided fire box shell, with circular top, we have two segmental pieces joined by a stout central or division plate. Each segmental half of this shell acts therefore just as though it were a complete circular shell, for the division plate has, of course, pressure on both sides, and acts by tension only to resist the bursting stress on the cylindrical segments. The welding of the longitudinal seams has been made possible by the introduction of gas for such purposes, which enables us to heat up the welding scarfs to the proper temperature and preserve their surfaces clear and free from dirt, oxidation or anything which might tend to make the weld less reliable than the rest of a plate. By welding, too, we may have perfectly circular barrels not otherwise obtainable without butt jointing and double covers, and so we avoid any tendency to grooving.

The back head is the only portion, except the tube plate already referred to, that is exposed to pressure and yet flat. As, however, it is chiefly occupied by the furnaces, this is of small account, and a slight gusset stiffening is all that is required as staying, and forms with similar staying of the front tube plate all the staying in the boiler. As now constructed, every part of the boiler may be machine riveted. As regards the valve gear it should be remarked that in place of a single slide-valve, four valves, all alike, are employed for each cylinder—two for steam and two for exhaust. They are of the gridiron or multiported type, and work up and down when in full gear only 1 1/2 inches vertically. The actuating gear consists for each cylinder of a single eccentric only, to the strap of which are attached the two eccentric rods. One of these for steam valves is rigidly attached to the straps, the other for the exhaust is pin-jointed. Each rod is suspended at a point 8 inches from its extremity by a long link to a block which slides upon a quadrant. Each block may be placed at any desired position on its quadrant by means of the reversing levers, and so decide the point of cut off, and whether the engine shall run forward or backward. The gear is very simple and readily comprehended. It has no working parts other than cylindrical pin-joints, and therefore works with a minimum of wear and tear. The final result of the gear is that boiler pressure is very nearly attained upon the piston. Steam pressure is carried by the piston to the fullest useful extent. Exhaust is quick, and the exhaust valve does not close before the proper time. Hence an indicator card is obtained of the fullest area consistent with proper working, and the power of the engine may always be a maximum for any given cut off. Thus a high speed is always possible, and the difficulties now experienced in connection with excessive compression entirely disappear. We are consequently enabled to obtain a greater tractive force per pound weight of engine, and instead of as now an engine being far too heavy for its work at high speeds we are able to more



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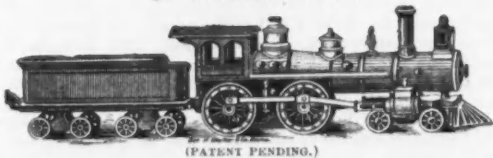
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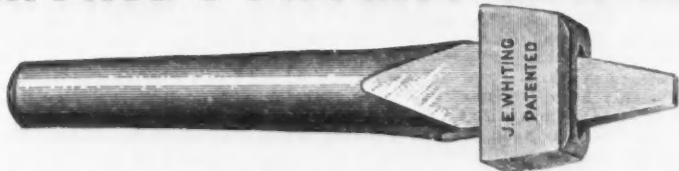
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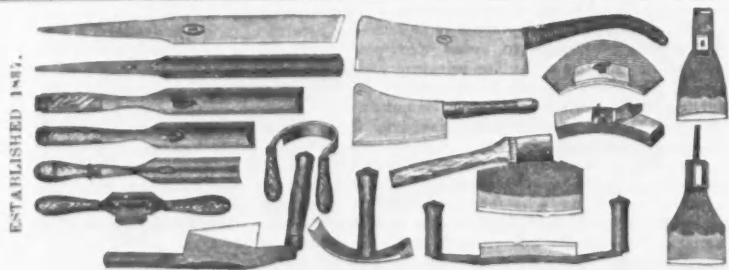
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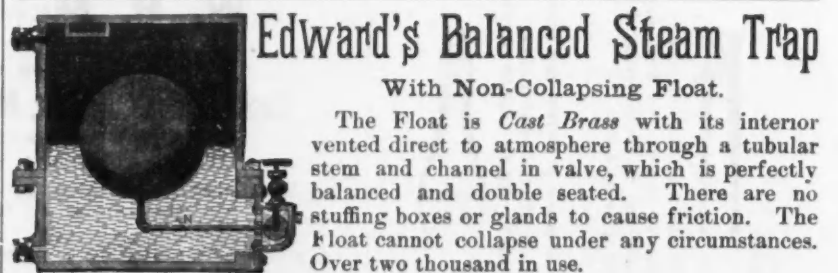
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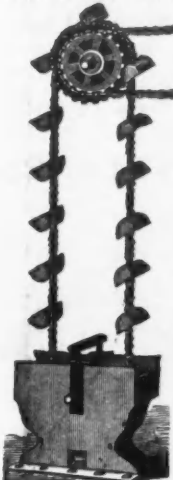
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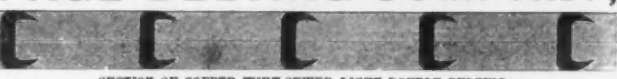
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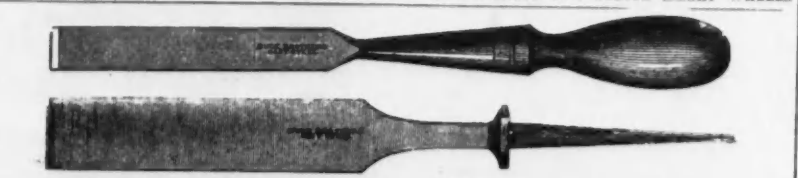
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in place of the usual steam chest. Suitable  
grooves are cut or milled out in the seats  
and arranged to fit the valves. In each  
valve of a 20 x 24 or 19 x 24 inch cylinder  
are 10 ports, each 4 3/8 long by 3/4 wide. The  
steam edge is, therefore, 46 1/4 inches long  
or nearly three times that of an ordinary  
valve. By this long admission edge the  
initial cylinder pressure very closely ap-  
proaches that in the boiler, and the rapid  
opening of the port and equally rapid closing  
insure that the initial pressure shall be well  
maintained and cut-off sharply defined. The  
same applies to the exhaust also, which may  
be kept open until just such point as will  
give a proper, but not excessive, compression.  
An ordinary locomotive at early cut-off  
loses about a third of its proper mean effec-  
tive pressure, from excessive compression,  
and this necessitates a later cut-off, and,  
perhaps, a threefold expansion only, in order  
to maintain the mean pressure we secure at  
a sixfold expansion. (We should remark  
here that Mr. Strong, at this point, showed  
and discussed a number of indicator dia-  
grams taken from engines with and without  
his valve gear.)

Much may be learned by a study of indi-  
cator cards, and not their least important  
use is an aid to general design and propor-  
tion of parts. Thus if we suppose that 1000  
feet per minute is the maximum proper  
piston speed, and cards generally show this  
to be a convenient limit, we find, then, that  
for a speed of 60 miles per hour the proper  
wheel diameter should be 81 inches, and so  
similarly for local traffic and maximum  
speeds of only 40 miles the wheels would be  
53 inches diameter. Generally it may be  
said that wheel diameters are too small in  
America, and it is an advantage of the Strong  
valve gear that the addition to the card area  
due to the reduction of the compression en-  
ables us to obtain an equal tractive force for  
the same cylinder with larger wheels than  
in an ordinary type of engine. While we  
would not advocate the over cylindering of  
an engine, we would point out that for econ-  
omical working a cylinder must be of a diam-  
eter sufficient to allow of the steam being  
pretty well expanded. Too frequently engi-  
neers will run with half-closed throttle, and  
in almost full gear, rather than employ the  
reversing lever for expansive working, and a  
probable cause of this may be the poor ex-  
haust given by the link motion. With  
separate exhaust valves, which can be set to  
full travel at all times, there is no excuse  
for using the throttle, which must always be  
thrown wide open, and all regulation effect-  
ed by expansion only up to six expansions,  
beyond which further regulation may be  
made with the exhaust lever. The impor-  
tance is shown, too, of reducing the general  
back pressure line down as closely to  
the atmospheric pressure as possible. To  
this end it is not merely requisite that the  
exhaust valve should have its full travel for  
all grades of expansion, but also that the  
blast nozzle should be as large as possible,  
consistent with steam raising, and the larger  
the fire-box the more gentle may be the blast  
within reasonable limits.

The highest power ever obtained from a  
locomotive hitherto has been 1200 horse-  
power. No. 444 (Strong locomotive) of the  
Lehigh Valley Railroad, when ran on the  
Northern Pacific road, on the 24th of June  
last, pulled 12 cars a distance of 10 1/2 miles  
in 11 minutes, from a dead stop to a dead  
stop. The weight of train was 370 tons,  
exclusive of engine and tender and with a  
boiler pressure of 160 pounds. Cards taken  
at a speed of 326 revolutions per minute  
show no less than 1810 horse-power, an un-  
precedented result. No. 444 has 6 coupled  
wheels of 62 inches diameter, carrying  
90,000 pounds on the drivers, with 27,000  
pounds on a 4-wheeled front truck and  
20,000 on a 2-wheeled rear truck. Her  
total wheel base is 30 1/2 feet, but the rigid  
base is only 5 feet 7 inches, the leading  
driver having a 7-inch blank tire, so that  
with swing motion to both trucks she can  
pass curves of 200 feet radius. Her grate  
surface is 62 square feet, and she has 1848  
feet of heating surface. With this she  
makes ample steam from the finest buck-  
wheat coal or screenings to take the heaviest  
trains up 60-foot grades, and does the work  
hitherto never done, except by two locomo-  
tives. She would haul 20 cars at 60 miles  
speed on a level and keep it up. For fast  
work, however, larger wheels than 62 inches  
are to be preferred.

**Smokeless Powder.**—Many military  
writers have expressed an earnest desire  
that smokeless powder, capable of being  
used in war, should be adopted. The ad-  
vantages of such a powder are obvious. It  
is of interest to note, therefore, that a new  
variety has been brought out in England.  
This powder, according to the London  
Times, is named the Johnson-Barland  
powder, or for short, the J.-B. powder.  
Last December there was an official trial of  
this powder at Enfield, and a favorable  
report was made to the War Office. Both  
the Martini-Henri and the Martini-Enfield  
were tried on that occasion with the follow-  
ing results: The Government powder, 85  
grains, gave with the Martini-Henri a  
muzzle velocity of 1314 feet per second; with  
the J.-B. powder, 60 grains, one of 1520 feet  
per second. With the Martini-Enfield the  
Government powder gave a muzzle velocity of  
1570 feet per second; with the J.-B. powder  
one of 1800 feet per second. Trials were  
recently made with an improved  
Gardner rifle-caliber machine gun; these  
showed that the new powder works, with  
very little sound and very much less fouling  
than the ordinary powder, supporting the  
claims made to that extent.

George B. Cowlam, of Louisville, Ky.,  
has published a pamphlet entitled "The Un-  
developed South," in which he describes the  
territory and its resources through which  
the proposed Nashville and Charleston Rail-  
road is to pass.

The Sprague Electric Railway and Motor  
Company, of New York, have issued a little  
pamphlet descriptive of the adaptation of its  
appliances to mining work.

### New Southern Coke Furnaces.—II.

The Sloss Iron and Steel Company are  
building

**TWO FURNACES AT NORTH BIRMINGHAM,**  
the work being done by Messrs. Gordon,  
Strobel & Lauran, Mr. I. Frusser, superin-  
tendent. The furnaces are 75 feet high by  
17 feet bosh, to be blown through 6 inch  
nozzle tuyeres. The diameter of the bell is  
to be 9 feet 6 inches. The diameter of the  
downcomer is 7 feet; the dust catcher is to  
be 17 feet high by 11 feet in diameter. The  
hearth will be Gordon's improved coils in  
cast plates, encircled by a wrought-iron  
jacket with expansive joints, while the  
boshes will be provided with double shelves  
of cast iron, within which are water-cooled  
plates always in contact with the air. The  
plant is to be equipped with eight Gordon-  
Whitwell-Cowper hot-blast stoves 17 feet in  
diameter and 65 feet high to the top of the  
wrought-iron hearth, the chimney being 45  
feet high. Steam is to be produced by four  
double batteries of Babcock & Wilcox water-  
tube boilers 30 inches in diameter and 18 feet  
11 inches long. Four blowing engines,  
built by Messrs. Edward P. Allis & Co., of  
Milwaukee, are a part of the plant. They  
have 40 inch steam cylinder, 84-inch blowing  
cylinders, with 5 foot stroke. The two  
draft stacks are 6 feet in diameter in the  
clear and 110 feet high. The pumping plant  
will consist of three pumps, with a 30-inch  
steam cylinder, 14-inch water plunger and  
12-inch stroke, coupled to the 15-inch suction  
pipe. The casthouse will be 50 feet by 150  
feet by 25 feet high, while the stockhouse  
will be 100 feet by 300 feet by 32 feet high.  
The ironwork of the stoves for No. 1 fur-  
nace is about completed, and the brickwork  
in two of them is nearly two-thirds ready,  
the ironwork for the furnaces being com-  
pleted. The boilers are all in position and  
nearly bricked in. The engine foundation  
is completed, and work has been begun on  
the brickwork for the engine beds and the  
brickwork of the engine-house itself. The  
foundations for the stoves of No. 2 furnace  
have been finished, as also the foundations  
for No. 2 furnace itself. The water tank  
foundation, 32 feet in diameter and 25 feet  
high, of solid masonry, is up. On it  
there will be a tank erected on eight cast-  
iron columns 32 feet high, the tank being  
made of 1/2-inch plate, to be 30 feet in diameter  
and 32 feet high, with a capacity of 172,000  
gallons. The foundation of No. 1 cast-  
house is completed, and upon it will be  
erected the building, which will be entirely  
of wrought iron. The stockhouse is about  
to be started, to be all constructed of wooden  
posts and wrought iron roof. It will be seen  
from this description that these furnaces  
will probably not begin operations until  
May or June next year.

In The Iron Age of November 3 we de-  
scribed in detail the plant of

**THE FOUR ENSLEY FURNACES,**  
actively going on in building. No. 4, the  
principal characteristic of which is the  
introduction into the Birmingham district of  
furnaces larger than those used hitherto—  
viz., 80 feet high by 20 feet bosh. Work is  
furnace at the greatest distance from the  
engine house is lined, the hot-blast stoves  
are complete and the downcomer ready. At  
the time of our visit the bell was being put  
in. No. 3 furnace is lined to the bosh and  
it will take two months to complete the lin-  
ing. The hot-blast stoves for this furnace  
are ready for the arch. On No. 2 the shell  
is up and the columns are in place. The  
ironwork of the hot blast stove is completed  
and the brickwork will be begun. On No. 1  
the columns are up and work is going  
on on the shell. The ironwork for the stoves  
is on the ground and everything is ready  
to begin the foundations for them. The  
casthouse for this furnace is just being  
taken in hand. Active work was going on  
in connection with the shells of the draft  
stacks. Six of the Weimer engines are in  
place and the foundations are being put in  
for the others. Thirty-two boilers are in  
place. While a great deal of work has been  
done in a short time, so much still remains  
that there is no prospect of blowing in any  
one of the furnaces before spring.

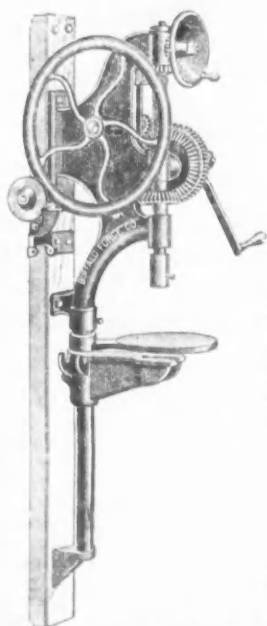
**THE TWO WOODSTOCK FURNACES**  
are being built at Anniston by the Wood-  
stock Iron Company. They are being built  
back to back. Behind each are the three  
Whitwell stoves, and between them the six  
batteries of boilers with the single draft  
stack. In front of the boilers is the engine  
house, with pump-house, while along the  
whole of the distance from the one end of  
the casthouse of one furnace to the end of  
the other furnace extends the stockhouse,  
with its double track elevated rail-road, the  
furnace being flanked by the hobs. The  
furnaces are being built from the designs of  
Messrs. Taws & Hartman, of Philadelphia.  
They will be 75 feet high, with 16 1/2 foot  
bosh, 10-foot crucible, blown through eight  
tuyeres. The Whitwell stoves will be 70  
feet by 16 feet 7 inches; the boilers, 18 in  
all, in six batteries, are 70 feet long by 42 1/2  
inches, with heaters 51 feet long by 32  
inches. These boilers, made of steel at  
Anniston, are now ready to go in.  
The engines, of which there will be five, built  
by Noble Brothers & Co., of Anniston, will  
have 36-inch steam cylinders, 50 inch blow-  
ing cylinders and 5 foot stroke. The stack  
will be 23 feet in diameter at the base to a  
height of 22 feet, and will then be carried up  
with a diameter of 16 feet to the top, the  
total height being 165 feet. At the time of  
our visit the shells of the furnaces were  
begun, the casting-houses, 144 x 56 feet,  
were building, the ironwork of the hot-  
blast stoves was under way, the foundations  
for the draft stack, boilers and engine house  
were completed, and work at the stock-  
house was under way. The furnaces will  
probably not blow in before May or June.

The Tennessee Coal, Iron and Railroad  
Company are building

**A NEW FURNACE AT SOUTH PITTSBURGH,**  
concerning which Mr. J. Lodge, superin-  
tendent, sends us the following details: The  
furnace is 75 feet high, with 17-foot bosh,  
10 foot diameter of bell, to be blown through  
six tuyeres. It is equipped with three 65 x  
18 Whitwell hot blast stoves, by James P.  
Wetherow, of Pittsburgh, Pa., the dimen-  
sions of the casthouse being 50 x 140 feet.



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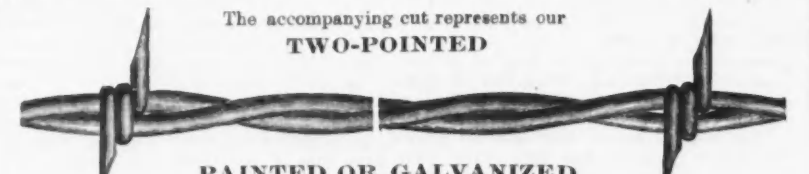
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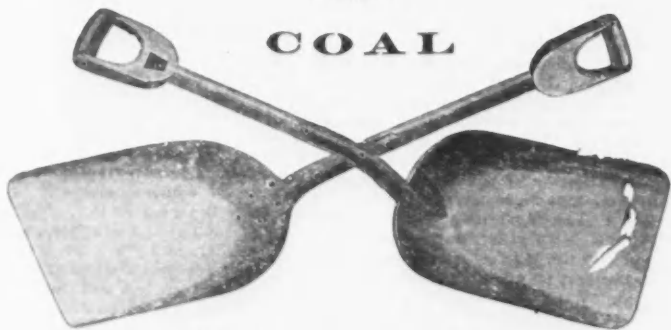
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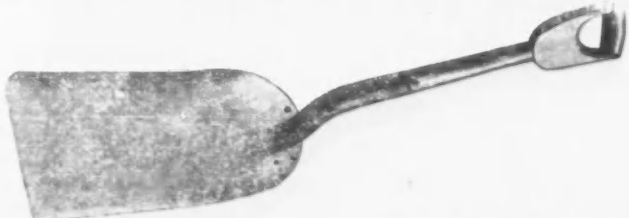
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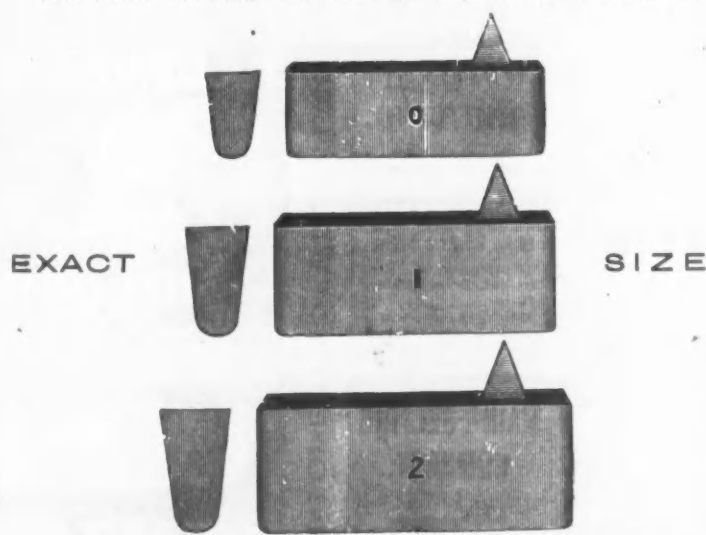


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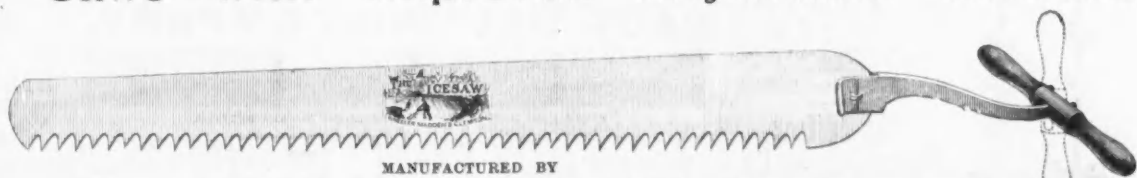
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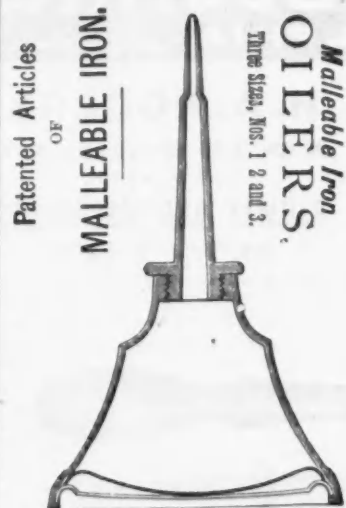
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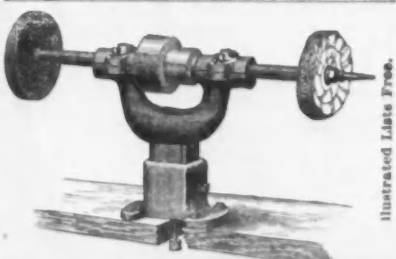
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The furnace will be blown by two engines, built by the Linn Iron Works, of Birmingham, Ala., having 36-inch steam cylinder, 84-inch blowing cylinder and 4 foot stroke. Steam will be furnished by four Babcock & Wilcox boilers, having 7600 square feet heating surface. Nearly all the work in connection with this furnace is completed, with the exception of the lining of the furnace and the erection of the engines. It is expected that it will be blown in about the 1st of February, 1888.

The furnace furthest advanced toward completion is that of

THE SHEFFIELD FURNACE COMPANY, at Sheffield, Ala. The plant consists of one furnace, 75 feet high by 17 feet bosh, the diameter of the crucible being 9 feet and that of the bell 8 feet 6 inches, the furnace being blown through 8 tuyeres. Back of the furnace are the three hot-blast stoves, and back of them, extending in a direction at right angles to the center line of the cast-house, is the stockhouse. To the right, parallel with the casthouse, are the boilers, and back of them the engine-house. The plant was designed by James P. Witherow, of Pittsburgh. It is equipped with three improved Whitwell hot-blast stoves, 18 feet in diameter and 90 feet high. The diameter of the down comer is 6 feet, equipped with a 12-foot dust catcher, 18 feet high. There are two Dickson engines, having a 36-inch steam cylinder and 84-inch blowing cylinder, with 4 foot stroke. Steam is furnished by 6 Heine boilers in three batteries 17½ x 12½ feet, the draft stack being 160 feet high by 8 feet in diameter in the clear. The stockhouse is 75 feet by 150 feet, the stock being raised by an Otis hoist. It is estimated that the daily capacity of the furnace will range between 110 and 125 tons, and it is expected that it will be in blast by about the 20th of December. Early in this month all the work was completed except the pipe connections for steam and water. It is reported that the furnace will be blown on Pocahontas coke, 1300 cars of which have been contracted for at \$5.10 a ton.

THE PULASKI IRON COMPANY have built one furnace at Pulaski City, Va., Mr. A. J. Dull, of Harrisburg, Pa., being president and Mr. A. S. Patterson, of Philadelphia, secretary and treasurer. Mr. John S. Kennedy, who was for eight years connected with the Pennsylvania Steel Company, at Steelton, Pa., is general manager. Ground for the foundation of this furnace was broken April 8, and it is expected that it will be blown in on or about January 20. The plant was from the design of James P. Witherow, of Pittsburgh, the furnace to be 75 feet high by 17 feet diameter of bosh, and 9½ feet diameter of bell, blown through eight tuyeres. The furnace is equipped with three improved Whitwell hot-blast stoves, 20 feet in diameter and 60 feet high. Blast is furnished by two Dickson engines, having a 42-inch steam cylinder and 84-inch blowing cylinder and 4 foot stroke. Steam is made in four Heine water tube boilers; the casthouse is 180 x 60 feet, and the draft stack 180 feet high by 10 feet in diameter in the clear. It is expected that the furnace will produce from 850 to 900 tons per week, the principal ore supply to come from the Cripple Creek region, although extensive contracts have been made for the Potsdam ores on the main line of the Norfolk and Western Railroad. The company own extensive mineral properties in the Cripple Creek region. The coke supply will come from the well-known Pocahontas region. Early in the month the company were already at work filling their stockhouse with ores.

### NEW PUBLICATIONS.

ROPP'S COMMERCIAL CALCULATOR. A practical arithmetic for practical purposes; 128 pages; pocket size. C. Ropp, Jr., author and publisher, Bloomington, Ill.

This is a very useful book for business men and all who desire to have at hand simple, short and very convenient methods of rapid calculation. It is a complete arithmetic in its comprehensive presentation of commercial tables, while it embraces many original methods of performing complicated mathematical computations, as well as proving the correctness of work already done. The advance and discount tables and accompanying methods of manipulating trade discounts, are particularly interesting and valuable. It is bound in three styles—cloth, 50 cents; American Russia leather, \$1, and Russia calf, gilt edges, \$1.50.

STEAM BOILER EXPLOSIONS. By Robert H. Thurston. Size, 5 x 7½ inches; 173 pages. Published by John Wiley & Sons. Price, \$1.50.

With the exception of the attention given to steam boiler explosions by the technical press and a few stray papers on the subject read before some of the engineering societies, very little has of late years been done in the way of arranging the results of accumulated experience and experimental investigation in a convenient and readily accessible form. It was with some interest, therefore, that we took up Professor Thurston's little treatise, in which the subject is considered from both theoretical and practical points of view, and were agreeably disappointed in finding it so much more complete and practically valuable than we had expected. Professor Thurston explains the origin of the book by the circumstance that in the year 1872 he was requested by the Secretary of the Treasury of the United States to prepare for the use of the Treasury Department a report on the causes and the conditions leading to boiler explosions, and began the preparation of such a report, in which he proposed to incorporate the facts presented in the treatise. A series of interruptions, however, prevented its completion at that time, and the subject has therefore been presented in the book before us.

Professor Thurston's first step naturally was an examination of the conditions under which energy is stored in steam and water, and the magnitude of the forces and energies latent in them when confined under high pressure. A series of formulas is accordingly given by means of which these energies may be readily calculated, being the results of the late Professor Rankine's investigations. A table is also attached, having been worked out under the supervision of the author, in which are given the magnitudes of the quantities of energy residing in available form in both steam and water for pressures ranging from 20 pounds per square inch up to 100,000 pounds. Still another table gives the weights of steam and of water contained in each of the more common forms of boilers, the total and relative amounts of energy confined in each under every day conditions of working, and their relative destructive powers in case of explosion. The figures, we need perhaps scarcely remark, are highly instructive and interesting, and show quantities of stored energy much beyond ordinary conception. Further on we find data relative to the energy stored in the steam space alone of boilers, showing that it forms but a small and unimportant fraction of the total energy. As regards the causes of boiler explosions, Professor Thurston agrees with all recent authorities in attributing them, almost without exception, to defective design, malconstruction, decay with time or in consequence of lack of care in preservation, and mismanagement. A statistical compilation of boiler explosions, which is given in connection with this, supplies a list of explosions in this country during the year 1885, and a table of comparative figures for the United States and Great Britain. Theories and methods of explosions due to other causes than simple increase of steam pressure or decrease in strength of boiler are next taken up. Clark and Colburn's water hammer theory is presented, and Lawson's well-known experiments and suggested remedies are reviewed. Following this are a number of pages given up to the subjects of energy stored in heated metal and superheated water; the effects of low water and sediment and incrustation, and the spheroidal state of water. A short chapter is devoted to the relative safety of the various types of boilers. Defective designs and construction and general and local decay are treated of at some length, with a number of interesting illustrations. A chapter on the management of steam boilers is full of valuable practical suggestions and could be studied with a good deal of profit by boiler attendants. From this the author passes on to a consideration of the results of explosions, in which he embodies a number of illustrations of exploded boilers and discusses some of the defects of design shown by them.

The concluding portion of the book deals with experimental investigations of causes and methods of boiler explosions which have been attempted from time to time. Special prominence is there given to a series of experiments proposed by a committee of the Franklin Institute and those projected and conducted some years ago at Sandy Hook by Mr. Francis B. Stevens. The conclusions derived from these are presented in a concise form, and fittingly close a volume which engineers generally can be assured of reading with a good deal of interest and profit.

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(Concluded from page 1.)

The distance between the saddle and out-board bearing is 5 feet 6 inches.

In front of the column A is located the driving cone for operating the boring spindle. This cone has six steps for a 4-inch belt, and is provided with a double set of back gears, giving 18 changes of feed to the spindle. The arrangement of the back gears will be readily understood from Fig. 4. The wheels F and F' are capable of being moved along one end of the spindle D so as to throw the former out of gear with its corresponding wheel on the main driving spindle, and bring the latter into gear with the wheel E, or vice versa, as desired. Both wheels, F and F', are secured on the spindle D by a feather. The boring spindle G is made of hammered steel 4½ inches diameter, and has a feed of traverse of 48 inches. Twelve changes of feed by power are provided, ranging from 1/16 to 1/4 inch per revolution of spindle. The speed, power and feed obtainable are sufficient for any diameter of bore from 1 inch to 24 inches. The spindle moves in a hollow sleeve by

from which finally motion is transmitted to the pulleys V, Fig. 3. The spindle carrying these has attached to it a pinion, gearing with the spur-wheel W, and the latter is mounted on a short shaft carrying a worm, W'. This worm gears with the worm-wheel X (Fig. 4), which by means of a friction feed, Z (Fig. 3), can be made to impart motion to a small spur-wheel gearing into the rack which is cut on the under side of the sleeve in which the boring spindle G is carried. When the power feed is not in gear, the boring spindle can be readily moved forward or backward by turning either of the hand-wheels Y or Y', the former, as shown in the plan, being arranged to work through a set of bevel pinions, a sliding clutch, f, also being interposed for throwing this particular wheel in and out of gear. The right-hand end of the spindle G, as both elevation and plan show, is provided with a number of thrust rings and a nut, great care having been taken in disposing of the strain at this point.

The horizontal travel of the table and the vertical movement of the saddles carrying the spindle G, as previously intimated, have speeds of 1 inch, 6 inches or 6 feet per minute as required for adjusting the work

work the sliding clutches, O O. These clutches operate on the same principle as the clutch d' already referred to, the several bevel pinions driven by them being mounted on sleeves furnished with clutch teeth, and turning loosely on the shaft N. The screw S, which moves the work-table, is operated indirectly through a pair of spur gears, the whole arrangement, we think, being made perfectly clear by the plan.

The shaft Z drives two elevating screws B B (Fig. 3) in the columns moving the saddles with the spindle G and boring bar G'. For a middle speed, 6 inches per minute, the spring lever K is again moved to its proper notch. The clutch x will then remain out, the clutch d' will move out of e into d, and the shaft N will be driven by the pulley P through the gears b, b', C, c', d, the clutch d', and its shaft and the end bevels near R. The gears a, a' and e meanwhile run idle. For a speed of 6 feet per minute, move the lever K to the high-speed notch, then the clutch d' will take the position shown; the clutch x will move into a and the shaft N will be driven by the pulley P through a, the clutch x and its shaft and the end bevels near R, the gears a', b, b', c', C, e' and e now running idle. It will be readily seen that all operations and movements are

is an increase of 1232 tons on their output for October. The blooming mill rolled 39,608 blooms, weighing 28,764 tons, which is an increase of 1209 tons on October. The rail mill rolled 76,841 rails, weighing 20,398 tons, or an average of 425 tons per turn on 48 turns. In October this mill rolled 19,690 tons of rails, which was an average of 419 tons per turn on 47 turns. Of the rails made in November, 70,656 were rolled direct from the soaking pits, and only 6185 were reheated, or 8.05 per cent. of the total production.

## The Coke Situation.

A meeting of the Western Coke Consumers' Association was held in the Monongahela House, Pittsburgh, on Wednesday, the 7th inst. The object of the meeting was to devise some means of securing a reduction in the price of coke, and also a reduction in rates of freight. The members of the association claim that the present high price of coke, together with the high rates of freight, has made the manufacture of pig iron a very unprofitable business, and that two furnaces in the Shenango Valley and two in the Wheeling district were recently compelled to close down, as they were un-

is not immediately adjusted the association would appoint a competent agent and pool their own coke. J. W. Moore, one of the largest independent operators in the region, was present at the meeting, and announced that his firm and that of J. W. Rainey & Co. would, in the event mentioned, join the Coke Producers' Association. If carried out the new association will be able to put 204 cars daily on the market more than any single company now in operation. It is claimed that the shipments for the month of November show that the distribution of cars has been greatly in favor of the syndicate, and were as follows: Frick & Co., 7768 cars, an average of over 2 cars per oven; McClure & Co., 2782 cars, or 1½ per oven; C. C. & I. Co., 1339, over 1½ cars per oven; J. M. Schoonmaker & Co., 3009, or over 2½ cars per oven, while the Producers shipped 1612 cars, or an average of 1¼ cars per oven. The total shipments in the region for November were 24,000 cars, against 25,700 for October and 28,701 in September. Of this output the coke syndicate shipped 17,500 cars, the Producers and the furnace owners, 6500. The average daily shipments were 950 cars, which is below the minimum capacity of the region and the actual requirements of the furnaces by at least 200 cars.

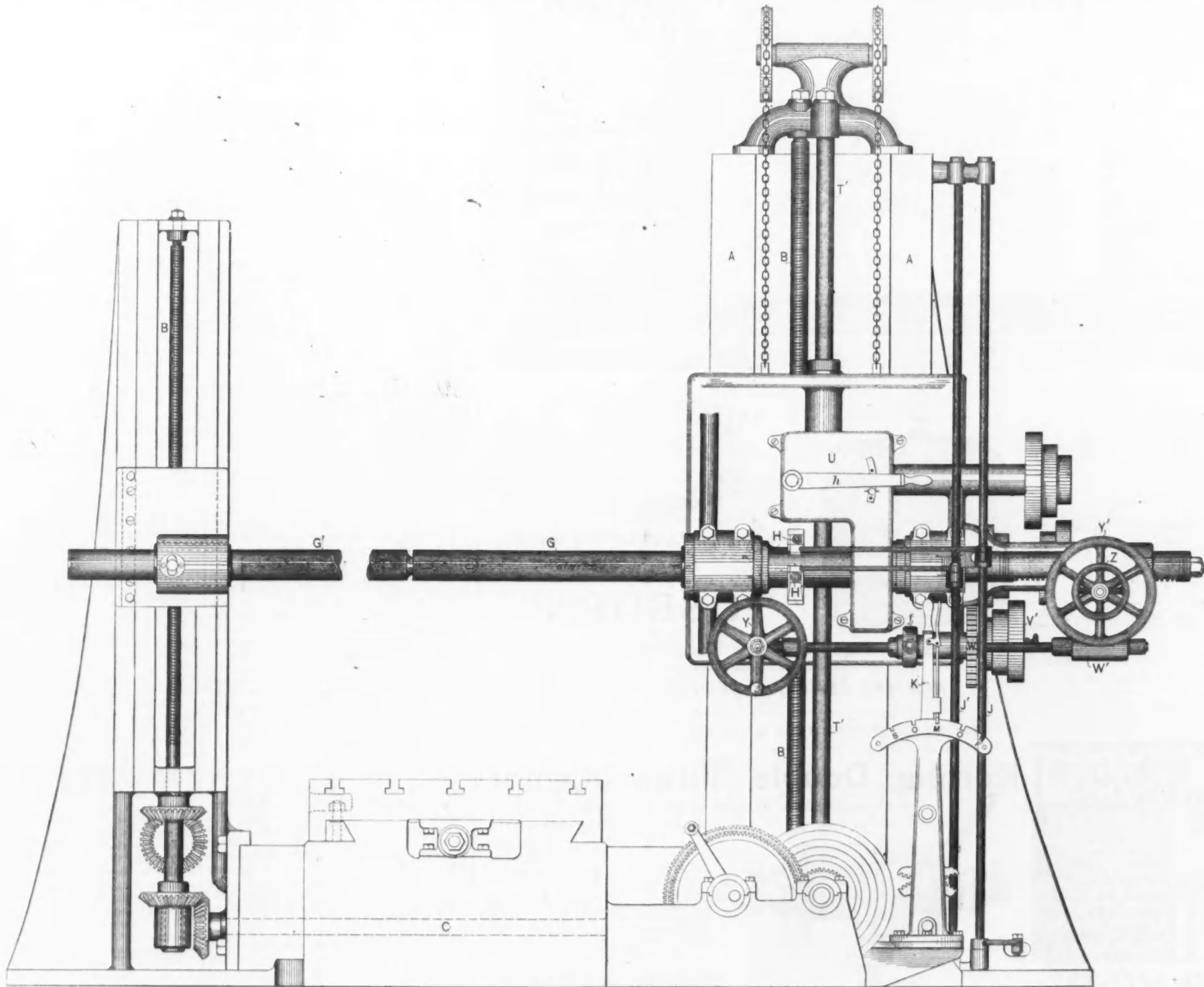


Fig. 3.—Front Elevation.

UNIVERSAL BORING, DRILLING AND MILLING MACHINE, BUILT BY THE NILES TOOL WORKS, HAMILTON, OHIO.

which it is driven, and the latter revolves in bearings, provided with brass bushes, with conical take up for wear. Behind the column A is located the pulley P (see Fig. 4) driving the gear for adjusting the table and saddle. Three speeds for adjustment are provided, slow—1 inch per minute; medium—6 inches per minute; fast—72 inches per minute, being the same for the saddle and the table. By means of a hand lever, K, conveniently placed in front of the column near the driving cone, the change from any one of the above speeds to the other can be instantly made.

Perhaps the best idea of the nature of the different motions and the purposes which they serve will be obtained by beginning with the main driving spindle T, and taking up the various parts one by one following out their functions. The spindle T then transmits motion, by means of a bevel gear, as shown in Fig. 1, to a vertical shaft, T', Fig. 3. The latter carries within the casing U two other bevel gears which, through a sliding clutch arrangement worked by the lever h, can be thrown in and out of gear with a third bevel wheel mounted on a horizontal shaft. On this shaft (marked V in Fig. 4), which on its extreme right hand end carries a set of cone pulleys, is in turn mounted a small spur-wheel gearing with a larger one, the latter imparting rotary motion to the boring spindle G. The spindle, it will of course be understood, can be revolved in either direction by changing the position of the clutch handle h. The cone pulleys on the shaft V, Fig. 4, are belted to another set of pulleys, as shown,

to the spindle or the spindle to the work. These speeds are governed by the spring lever and notched quadrant K, in the following manner: In back of the main column A, of the machine is a double cam, M (Fig. 4) which can be revolved by the lever K, shaft K' and the bevel gears and spindle L. The cam M gives reciprocating motion to two connecting rods m and m' working sliding clutches x and d'. The pulley P is driven by an overhead countershaft, and carries with it the pinions a and b. The pulley P and all the gears a, b, b', C and c', &c., run loose on their respective shafts. The gears a' and e' and the clutches d' and x are, on the other hand, feathered to their shafts.

The operation is as follows: For slow speeds, move the lever K to the proper notch, indicated by the letters in Fig. 3. The cam M will then throw the clutch d' into the bevel e (the latter being mounted on a sleeve which is furnished internally with teeth to mesh with those of the clutch), and the shaft N will be driven by the pulley P through the gears a and a', the worm and worm-wheel shown, the gears e' and e, the clutch d' and its shaft and the bevel wheels near R, and so impart slow motion to either the screw S or to the shaft Z, or to both, and in either direction, as may be determined by the levers H and H'. It will be observed that these levers govern two rods, Q and Q', through the intervention of the vertical shafts J and J', and a series of bell cranks. The rods Q and Q' pass to the rear of the machine and through two other rods, only one of which, R, can be readily seen, as they are superimposed one upon the other,

under full control of the operator from one position, and that at the front of the main pillar A.

The machine was built with a view to standing hard work, and is a tool of splendid design and perfect work. It is of great strength and power, and has probably a greater range than any tool ever designed for similar work. In all respects it may be regarded as a triumph of mechanical skill. For general purposes in large engine works and shipyards, a modification of this tool is built. Its construction is the same as that of the one we have described, except that the table or platen of the machine is stationary and the column or upright traverses to and fro on the bed. In other words, the column carrying the spindle is moved up to the work, the latter remaining stationary. For heavy boring, drilling and milling the machine has superior advantages, and such work can be accomplished at a great saving of labor.

Machines of this kind have recently been built for the shipyards of the Wm. Cramp & Sons' Ship and Engine Building Company, and for Messrs. Gordon, Strobel & Laurens, metallurgical engineers, both of Philadelphia, Pa.

The Union Steel Company, of Chicago, have supplied us with a report of their production for the month of November, which surpasses all previous records of production by this or any other company. With two converters only they made during the month 2,497 blows, producing 19,900 Bessemer steel ingots, weighing 24,393 gross tons, which

able to secure even cost for pig iron manufactured. J. J. Spearman, of the Spearman Iron Company, of Sharon, Pa., acted as chairman of the meeting, and Robert Bentley, of the Ohio Iron and Steel Company, of Lowellville, Ohio, acted as secretary. After a full discussion of the question was had by the members present, it was resolved to appoint a committee to confer with the coke operators and the railroads, and endeavor to secure a reduction in the price of coke and also in railroad rates, the committee to report to the association at a meeting to be held at an early day. The following named gentlemen were appointed on the committee: Aaron Wilcox, St. Louis; Henry O. Bonnell, Youngstown; J. J. Spearman, Sharon; Frank J. Horne and H. T. Hubbard, of Wheeling, and John Z. Speer and Major Moorhead, of Pittsburgh.

Another meeting of the Coke Producers' Association was held at the Yough House, at Connellsville, Pa., on Thursday, the 8th inst., with the object of compelling the syndicate to adopt some means of bettering the situation of affairs in the Connellsville region. During the progress of the meeting it was developed that the distribution of cars has grown no better than it was a month ago, notwithstanding the notice served upon the syndicate that damages would be demanded for all losses sustained through a failure to run the works to full capacity. A committee was empowered to employ an attorney to give advice and to determine the extent of damage caused by the breach of contract on the part of the syndicate. It was also decided that if the matter

Pittsburgh got its full quota, but the Western furnaces were compelled to share the shortage to the extent of 150 cars daily. The loss of the remaining 100 cars fell upon the furnaces in the East and the foundries. Though the foundry trade is quite profitable, the shippers have almost entirely abandoned it in order to keep the furnaces running.

After the meeting had adjourned, a member of the Coke Producers' Association who was present made the following statement, and as it probably voices the sentiments of every member of the association we publish it. He said: "We have waited long enough for a solution of this question. We are growing tired of seeing the syndicate make and ship coke in large quantities and we not run more than half full, while there exists a contract which plainly says that the cars shall be distributed in proportion to the number of ovens fired. It is only a matter of time with us. If the difficulty is not remedied we will do as we agreed to-day—namely, to open an office in Pittsburgh and sell our own coke. If we do that we will represent 2200 ovens, or 264 cars per day. Schoonmaker has but 1266 ovens, McClure & Co. 1500 and Connellsville Coke and Iron Company only 1000. We have renewed our pledges to stand firm, and we mean strictly business."

The last issue of the Journal of the Franklin Institute contains the full text of a lecture on "The Crucibles of Blast Furnaces," delivered by Mr. John M. Hartman, of Philadelphia, from the standpoint of the practical founder. It is an able effort, which pig



iron manufacturers will read with interest, though they may disagree with Mr. Hartman in some of the points he discusses.

Col. R. T. Auchmuty, the founder of the New York Trade Schools, in a paper read before the American Institute, presented the subject of "An American Apprenticeship System." The old system of apprenticeship, he

enter a trade. The schools do not graduate journeymen, but apprentices. There should be a trade school in every town, and the result would in a short time place the American artisan at the head of his profession. The combination of the trade school with the workshop he looked to as one of the solutions of the labor problem. It is the unwillingness, Colonel Auchmuty said, of

**Steel for Shells and Armor Plates.**—A trial of shells manufactured by the Compagnie des Forges de Châtillon et Commeny, made lately at the fort of Givres, gave the best results yet obtained. The shell pierced a 15 $\frac{3}{4}$  inch plate of Creusot manufacture. When subsequently picked up in the sea, 5000 feet beyond, it had undergone no appreciable deformation. M.

It is a simple process by which steel may be welded. The specification forming a part of the letters patent relates that Mr. Middleton has discovered "that pieces of steel may, at the proper welding heat, be perfectly, cheaply and easily welded together after the pieces to be welded have been coated with a solution of silicate of soda or other solution in which silica is contained." He continues:

stances in a dry and powdered form, but his patent covers the use of silicate of soda or other silicates as a solution in any manner that may be desired. From time to time in the past few years there have been announcements of the discovery of methods of welding steel, but depending chiefly upon the application of some dry substance they have proved of little practical value. Under

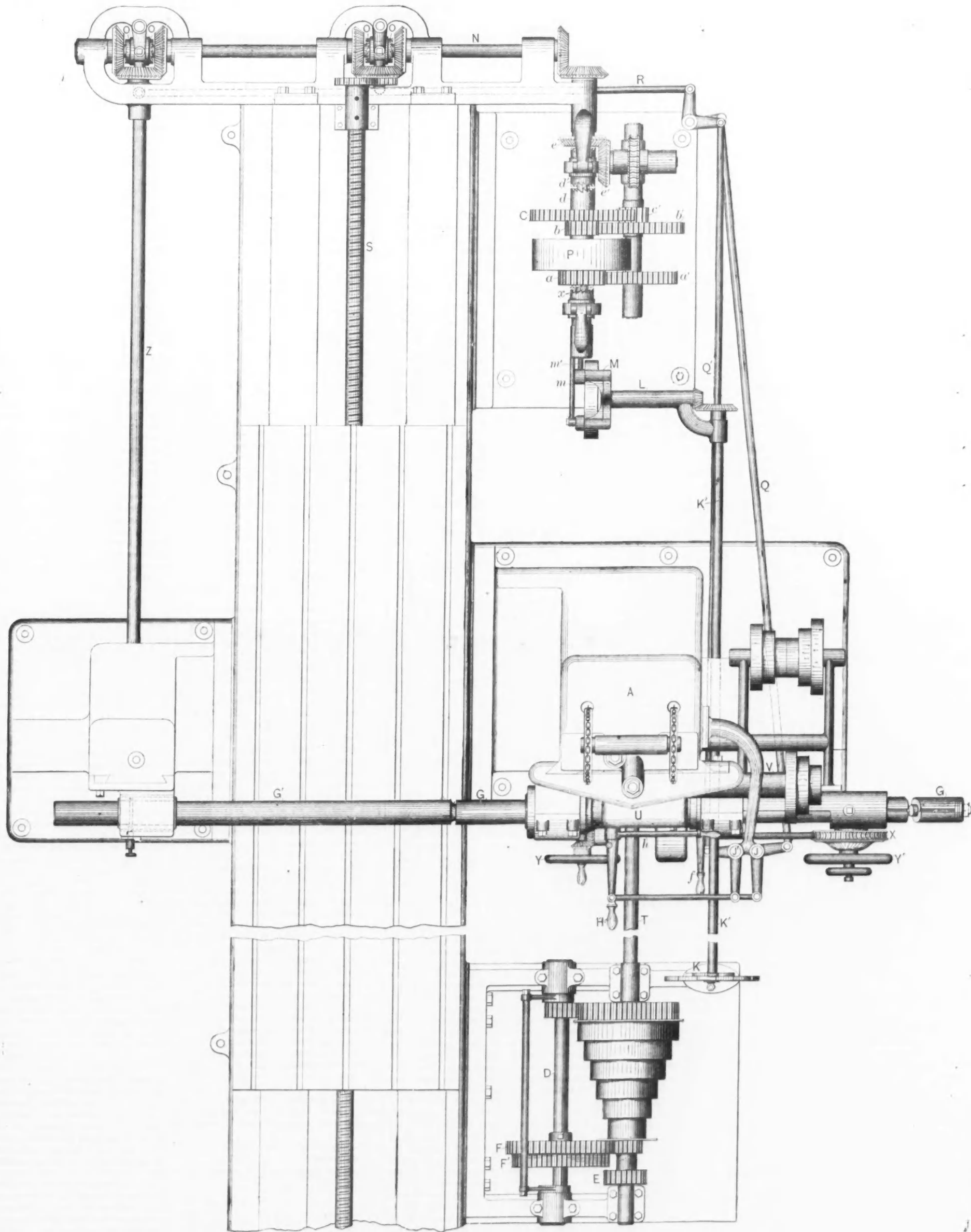


Fig. 4.—Plan.

UNIVERSAL BORING, DRILLING AND MILLING MACHINE, BUILT BY THE NILES TOOL WORKS, HAMILTON, OHIO.

said, had died a natural death. It required the supervision of a master and surrender of independence on the part of the lad. To-day the master of a large shop has no time to give his attention to an apprentice, and the lad has to pick up his knowledge by observation and as best he can; a change of fashion or an improvement of machinery may render his skill useless. The trade school can teach what the shop does not. Work in the schools, like the study in a business college, is intended to fit a man to

the master mechanics and journeymen in trades to permit young men to learn trades, lest they should become rivals, that stands in the way of trade schools. This works a great hardship to young men. Take one trade, for example, that of bricklaying. The trades organizations in this city will not permit over 85 young men to learn in one year the bricklaying trade as apprentices. It is a question, Colonel Auchmuty added, whether young men should have a chance to make a living.

Alfred Evrard, who some time ago introduced the manufacture of armor steel at the Firminy Steel Works, has, it appears, improved his system of late. He claims to be able to make armor plates which no shell can pierce.

**The Middleton Steel Welding Process.**—Mr. William Buller Middleton, manager of the Penn Iron Works, has been at work for some time testing a metallurgical discovery which promises to prove of value.

"In the practice of my invention I have obtained highly satisfactory results by applying a solution of silicate of soda to the pieces of steel to be welded by dipping said pieces in said solution, or by pouring it upon them, fusing together the pieces to be welded and heating them to an ordinary welding heat and then passing them through welding rolls of ordinary and well-known construction." The patentee declares that he makes no claim to the various proposed methods of welding steel with silica and other sub-

Mr. Middleton's invention, the masses of steel to be reworked can be dipped in a large bath of solution of silicate of soda, or other silicate, placed in the heating furnace, and when at the proper heat withdrawn and passed through the rolls.

China is credited with good statesmanship in acknowledging the independence of Korea. The latter having refused to forward an annual tribute to China, recognition was cheaper than a declaration of hostilities.



# The Iron Age

AND METALLURGICAL REVIEW.

New York, Thursday, December 15, 1887.

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## "Vicious, Inequitable and Illogical."

A document as dignified and important as a message addressed to Congress by the President of the United States, should not be hastily judged. Newspaper generalizations, based upon a hasty and superficial reading, are apt to do such a document injustice. Presumably, it is the result of careful study and preparation. It is at least entitled to a thoughtful reading. For this reason we have postponed for a week its editorial discussion. What we now have to say about it is the result of as careful consideration as the document is entitled to.

We respect an honest and intelligent advocate of free trade. Some men are so constituted that they cannot but accept abstractions as economic truths. From a theoretical standpoint, a great deal may be said in favor of the absolute freedom of international exchanges of commodities. We are willing to listen respectfully to a presentation of these views, and to arguments in support of them. We also recognize the right of those who have given the subject thoughtful attention, to oppose the principle of protection to domestic industry, and to advocate making our markets free, even while those of the rest of the world are more or less effectually closed by duties for revenue or protection. But when the President of the United States, in an official communication to the Senate and House of Representatives, ventures to characterize as "vicious, inequitable and illogical" a principle which for more than a quarter of a century has been embodied in our economic legislation—a system under which the country has experienced a manufacturing development that has silenced prophecy and confused statistics, which more than half the American people believe in and are prepared to sustain against all attacks from citizens or aliens—he forfeits the right to a respectful consideration for what he has to say. Unfortunately,

nately, a document of this character cannot be dismissed as one would throw into the waste basket a pamphlet by some intemperate writer who seeks to strengthen a bad cause by reckless and indefensible attack upon that which has been proven good by long experience. Whatever its tone or its value as a contribution to economic literature, it is the President's message, voicing the plan and purpose of the party of the Administration, and likely to exert a great influence, not only in shaping legislation this winter, but in deciding the next Presidential election. How mischievous its influence may be cannot well be judged so soon; but if it accomplishes nothing worse, it will have a depressing influence upon most of the great industries contributing to the national wealth and discourage large enterprises of internal improvement.

Those who have read the President's message do not need to be told that it is characterized by the nascent zeal of one who suddenly becomes interested in a question which he has previously known very little about. It would seem to be in bad taste for a President to attempt to instruct Congress in the elements of political economy when he is obviously ignorant of them himself. What he says about the surplus, being based upon Treasury statements, is no doubt true, and all classes of the people would approve a strong recommendation that the revenues be reduced to the requirements of a wise, prudent and liberal administration. The people were also prepared for a recommendation that the tariff be revised and that considerable additions be made to the free list. All this, and more, the President might have said with propriety. Indeed, he might have urged Congress to concede the propriety of abandoning the principle of protection to domestic industry and making trade as free as that of other countries offering us commercial reciprocity. It was, however, wholly unnecessary for the President to support his position by an argument which would be severely handled if presented in a college debating club. The following quotation will serve for illustration:

These laws, as their primary and plain effect, raise the price to consumers of all articles imported and subject to duty by precisely the sum paid for such duties. Thus the amount of the duty measures the tax paid by those who purchase for use these imported articles. Many of these things, however, are raised or manufactured in our own country, and the duties now levied upon foreign goods and products are called protection to these home manufactures, because they render it possible for those of our people who are manufacturers to make these taxed articles and sell them for a price equal to that demanded for the imported goods that have paid customs duty. So it happens that while comparatively a few use the imported articles, millions of our people, who never use and never saw any of the foreign products, purchase and use things of the same kind made in this country, and pay therefor nearly or quite the same enhanced price which the duty adds to the imported articles. Those who buy imports pay the duty charged thereon into the public treasury, but the great majority of our citizens, who buy domestic articles of the same class, pay a sum at least approximately equal to this duty to the home manufacturer. This reference to the operation of our tariff laws is not made by way of instruction, but in order that we may be constantly reminded of the manner in which they impose a burden upon those who consume domestic products as well as those who consume imported articles, and thus create a tax upon all our people.

It is nearly a quarter of a century since any one who valued his reputation, or had any reputation at stake, has ventured to use in attacking protection this venerable and shop-worn argument. It will not bear a moment's investigation in the cold light of facts. Millions of dollars worth of imported merchandise are every year sold in our markets for less than they cost importers, and domestic goods of unknown value are every year sold for consumption without returning to the manufacturers the net cost of producing them. Only under exceptional conditions and for very brief periods, have domestic manufacturers been able to realize profits approximating the rates of duties imposed on competing imported articles. During long intervals it has been possible to export the surplus products of many lines of manufacture to markets in which the cheapest of foreign producers have equal and indeed better advantages. The President speaks of the "immense profits" of our manufacturers, as if they existed in fact and not merely in imagination. We venture to say that manufacturing under the tariff has not returned exceptional profits, taking the average of any ten years since the close of the war. In some of the largest industries the margin of profits has been very narrow. We feel justified, therefore, in saying that an argument intended to influence the action of Congress, which proceeds from false premises to mistaken conclusions may, without impropriety, be characterized in the President's own words as "vicious, inequitable and illogical."

To this conclusion we are also brought by the clauses introduced into the message to mislead the manufacturers and wage-earners. The President says:

But the reduction of taxation demanded should be so measured as not to necessitate or justify either the loss of employment by the workman or the lessening of his wages, and the profits still remaining to the manufacturer, after a necessary readjustment, should furnish no excuse for the sacrifice of the interests of his employees either in their opportunity to work or in the diminution of their compensation.

This and several paragraphs of like tenor are wholly inconsistent with the arguments with which he supports his attack upon protection. If the system which protects American labor is "vicious, inequitable and

illogical," should any concessions be made by honest reformers in the interest of those who are the admitted beneficiaries of this system? What the President says on this subject is evidently an afterthought. It has made his position even more ridiculous than his argument.

The object of this message is obviously to make the tariff the issue of the next Presidential election. Unless we wholly mistake the tone of public opinion in the United States, this is a grave and irreparable political mistake, viewing the matter from a Democratic standpoint. We have no concern on this score, but probably Mr. Cleveland has. If he sought to strengthen his own position and that of his party by his message, the weapon which was intended to create consternation in the ranks of the party in opposition will turn out to be a boomerang. We do not believe, however, that the party managers who assume the direction of the Presidential canvass next year will accept the tariff as an issue with which to go before the country. Mr. Cleveland could not have been elected on this issue, nor do we believe he can be re-elected on it. The strength of the two great parties in national politics is so evenly balanced that a very little will turn the scale either way, and we are quite sure that the party which risks its fortunes upon the platform which the President has furnished will find itself some 30 years behind public opinion on economic questions.

## The Condition of the Blast Furnaces on December 1.

As will be observed from the figures given below, there has been a decline in the capacity of the furnaces running on anthracite and coke pig. As yet, this falling off is small, but since then additional furnaces have gone out of blast. Still the make continues heavy, at the rate of 128,322 gross tons per week, not counting in the charcoal furnaces, which add 11,718 tons weekly, making the total 140,040 tons. The tendency, however, is now evidently in the direction of a slightly reduced make.

The following is the status of the anthracite furnaces:

Anthracite Furnaces in Blast, December 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number of furnaces out of blast.	Capacity per week.
New York.....	32	13	3,702	19	4,661
New Jersey.....	15	5	1,494	10	3,135
Pennsylvania:					
Schuylkill Valley.....	41	21	7,020	20	3,638
Lebanon Valley.....	24	19	5,975	5	1,090
U. Susquehanna Val.....	18	9	2,591	9	1,625
Maryland.....	4	1	290	3	455
Total.....	198	122	39,487	76	18,054

	Furnaces in blast.	Capacity per week.
December 1.....	122	39,487
November 1.....	124	40,028
October 1.....	123	39,440
September 1.....	125	38,538
August 1.....	129	37,380
July 1.....	138	40,742
June 1.....	138	44,188
May 1.....	137	43,502
April 1.....	139	43,585
March 1.....	141	43,724
February 1.....	137	41,951
January 1.....	130	40,735
December 1.....	119	36,820
November 1.....	116	36,548
October 1.....	114	35,819
September 1.....	112	33,207
August 1.....	130	36,841
July 1.....	117	36,762
June 1.....	121	38,359
May 1.....	119	36,924

The production of anthracite pig-iron has fallen off somewhat during November, and since the beginning of the current month a slight further decline has taken place. In New York one of the Burden and one of the Hudson furnaces has gone in and one of the Elmira furnaces has resumed work. On the other hand, Cold Spring has blown out. We estimate the November product at 15,865 gross tons, exclusive, of course, of the Troy furnaces classed under coke. In New Jersey Chester, Franklin, Oxford, Pequest and Secaucus alone are producing, their total make during November having been 7006 gross tons. In the Lehigh Valley the Crane Company entered the month with all furnaces running. The Lehigh Company had blown out one, and the Thomas Company were working with eleven, one of which has, however, since gone on the idle list. In the Schuylkill Valley the number of active furnaces was temporarily lessened by the idleness of the Plymouth furnaces, one of which, however, is expected to resume work at an early date. Leasport possibly may be producing before this report reaches our readers. In the Lower Susquehanna and the Lebanon Valley there have been no changes of any consequence. We estimate the November output of the latter, practically all made from Cornwall ore, at 26,224 gross tons. In the Upper Susquehanna Valley both the Danville furnaces are now idle, and Union has stopped for repairs. On the other hand, Marshall, which was idle from October 25 to November 26 on account of a gas explosion, is again running. We are informed that the majority of the shares of the Bloomsburg Iron Company owning the two Irondale furnaces have recently changed hands, Knorr & Winterstone, attorneys of Bloomsburg, being the purchasers. Who the owners will ultimately be is not yet known.

## Bituminous and Coke Furnaces in Blast

December 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York.....	3	2	2,060	1	1,300
Pennsylvania:					
Pittsburgh district.....	19	19	19,000	0	0
Shenango Valley.....	19	15	8,906	4	2,176
Juniata & Conemaugh.....	22	14	6,338	8	1,492
Allegheny.....	1	1	1,191	0	0
Miscellaneous.....	1	1	1,483	2	700
Maryland.....	1	0	0	2	340
West Virginia.....	11	2	3,372	4	1,885
Kentucky.....	4	2	2,450	1	250
Ohio:					
Mahoning Valley.....	14	9	6,713	5	3,350
Hocking Valley.....	15	2	395	13	1,987
Hanging Rock.....	14	11	2,044	3	599
Miscellaneous.....	17	12	7,924	5	2,330
Illinois.....	16	12	13,001	4	1,790
Missouri.....	8	3	20,651	5	1,920
Wisconsin.....	3	1	574	2	1,086
Michigan.....	2	1	215	1	140
Alabama.....	12	10	4,504	2	831
Tennessee.....	9	9	4,053	0	0
Georgia.....	2	2	802	0	0
Colorado.....	1	1	490	0	0
Total.....	209	144	88,835	65	22,997

As compared with previous months these figures stand:

	No. of furnaces.	Capacity per week.
December 1.....	144	88,835
November 1.....	151	90,459
October 1.....	152	89,123
September 1.....	145	83,134
August 1.....	113	62,091
July 1.....	98	47,319
June 1.....	98	44,865
May 1.....	148	83,500
April 1.....	148	81,796
March 1.....	146	79,682
February 1.....	145	79,257
January 1, 1887.....	137	73,422
December 1, 1886.....	130	73,735
November 1.....	140	73,013
October 1.....	136	70,802
September 1.....	135	69,306
August 1.....	133	68,832
July 1.....	132	71,316
June 1.....	129	70,766
May 1.....	129	67,888

In New York the Troy furnaces, particularly one of them, have been making a good record, one of them producing an average of over 200 tons per day. For the first time in years every furnace in the Pittsburgh district is active, Shoenberger, Speer & Co. having blown in their No. 2, which has been idle for a long time. It went in in mill iron, while No. 1 is making Bessemer pig. The present capacity, large as it is, may be considerably increased during the coming year by the erection of another furnace at Braddock, by Carnegie, Phipps & Co., although the matter is not yet definitely settled.

In the Shenango Valley both of the Douglas furnaces happened to be out of blast on the 1st inst., No. 2 stopping on the 26th ult., while No. 1 was only blown in on the 3d inst. In the Juniata and Conemaugh valleys the whole plant of the Cambria Iron Company was at work, while the new Powel furnace, at Saxton, is to go in at an early date. In Virginia the new Pulaski furnace is to make its first iron in January. In West Virginia Irondale has resumed work. In the Mahoning Valley Grace is out, and No. 2 Hubbard blew out on the 24th ult. In the Hocking Valley only two stacks were running on the 1st inst. All of those of the Columbus and Hocking Coal and Iron Company were idle on account of scarcity of water. Among the furnaces in Central and Northern Ohio classed as "miscellaneous" we may note that one of the Jefferson furnaces was blown out late in November; another is, however, to go in at an early date, if, indeed, it is not now at work. In Illinois the product has continued heavy, the make of the 12 furnaces being not less than 55,719 gross tons, as compared with 55,788 tons in October. In Wisconsin one of the Bay View furnaces has stopped, and the Minerva is reported idle. In Tennessee every one of the furnaces is making iron, the aggregate product having been 17,370 tons in November. In Alabama the only idle plants are the Edwards and one of the Woodward furnaces, where the Brown automatic hoisting system is being taken out to make room for an ordinary hoist. The other Woodward furnace is achieving the distinction of making the best record in Alabama, its average for November having been 107 tons a day, the only so-called 100-ton furnace in the district, which, so far as we are aware of, has earned the title. In Georgia both companies are working, Cherokee Furnace having lost some days on account of scarcity of coke.

The condition of the charcoal furnaces was as follows:

Charcoal Furnaces in Blast, December 1.

Location of furnaces.	Total number of furnaces.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New England.....	14	8	635	6	446
New York.....	10	4	727	6	493
Pennsylvania.....	23	6	582	17	615
Maryland.....	13	2	182	11	750
Virginia.....	24	6	288	18	770
West Virginia.....	3	0	0	3	163
Ohio.....	18	9	846	9	630
Kentucky.....	2	2	211	0	0
North Carolina.....	2	1	92	1	83
Tennessee.....	2	0	0	2	305
Georgia.....	2	0	0	2	114
Alabama.....	9	6	1,354	3	581
Michigan.....	25	15	4,189	10	1,690
Minnesota.....	1	0	0	1	250
Wisconsin.....	2	0	0	2	440
Illinois.....	11	3	673	8	1,116
Texas.....	2	0	0	2	800
California.....	1	0	0	1	985
Washington Terr.....	1	1	175	0	0
Oregon.....	1	0	0	1	100
Total.....	175	70	11,718	105	8,908

This shows a slight falling off, due to the blowing out of larger furnaces, among them the Shelby, against which only smaller furnaces have gone in, chiefly in the Hanging Rock region.

## Latest Trade Returns from British India.

The latest official report of Mr. J. E. O'Connor on the foreign commerce of British India for the fiscal year ended March 31, 1887, just published, contains as usual a great deal of valuable information of special interest to Americans, inasmuch as some items, directly or indirectly, concern leading domestic products of ours, such as wheat, flour and petroleum. From the details before us it appears that the foreign trade in private merchandise alone, leaving aside the imports and exports for account of the Government of India, has increased remarkably in a single year.

Import of Merchandise.

1886-87, 1885-86, Increase  
£44,022,000 £38,858,000 £5,164,000, or 13¼ per cent.

Export of Merchandise.

£66,329,000 £62,870,000 £3,459,000, or 5½ per cent.

Two-thirds of the increase arose from the sudden revival in cotton goods importation from England, which of late years had been flagging, so that the stock thereof had run very low.

Exportation of brown, white and colored cotton cloth from Lancashire to India at once followed on a vast scale, leading to the following increase of importation:

1886-87, 1885-86, Increase

Yards. Value. Yards. Value.  
2,155,419,000 £19,016,000  
1,740,813,000 £13,447,000

Increase..... 414,606,000 or 23¼ per cent. £5,569,000 or 39¼ per cent.

Another notable increase took place in the import into India of English cotton twist, of which 49,014,000 pounds were received, worth £2,489,000, against 45,916,000 pounds, worth £2,379,000, the previous fiscal year. Furthermore, silk and woolen goods show an increase, the former chiefly coming from China. While iron importation has diminished, that of steel has augmented. The erection of new cotton factories has led to the import of machinery on a larger scale. Less railroad material has been introduced by private companies, but the Government received some. Petroleum importation is assuming greater and greater proportions. It included during the 12 months under review 1,500,000 gallons per steamer via Suez from Batum, Caucasus. In connection with this importation of Russian refined oil, it may be remarked that Batum shipped this year to India from January 1 to October 15, by a dozen steamers altogether 8,584,660 gallons, whereas the shipments from the United States in the same direction reached 94,576,634 gallons. On November 25, 1887, a cable dispatch from Peshawar stated that a large and constant supply of petroleum is assured from the Chatan wells in Beloochistan, which are to be connected with Sibi on the Quetta Railroad by a pipe line 65 miles in length.

About 80 per cent. of total Indian merchandise importation arrived from the mother country, the proportion of five years ago being kept up. Among Indian exports wheat, as usual, deserves our special attention. At no previous time had so much of the staple left India by sea, the increase, as compared with former years, being five per cent. The distribution, in thousands of cwt., to the following countries, was—

	1886-87	1885-86	1884-5
England.....	9,697	12,071	7,448
Belgium.....	2,403	2,661	1,738
France.....	2,803	2,145	3,832
Holland.....	207	86	134
Italy.....	5,312	1,218	701
Malta.....	34	34	38
Spain and Gibraltar.....	194	270	93
Egypt.....	1,317	2,296	2,149
Mauritius and Reunion.....	57	34	35
Aden and Arabia.....	168	174	82
Totals.....	32,102	30,089	18,782

In Italy the hard wheat of India is superseding Russian, because the flour from it is the best procurable for the manufacture of macaroni, which in its turn begins to take the place of Indian corn in consumption by the lower classes. Therefore this particular kind of wheat seems to have a great future there, the more so as it can be laid down at a very low figure compared with other grades. Meanwhile India is developing quite a flour milling industry at Bombay, and 319,000 cwt. of flour was exported thence the last fiscal year, against 168,000 cwt. the previous twelvemonth. None of this flour has gone to Europe, but samples have now been sent to Italy, and it is thought the latter will prove a suitable market. The yield of this year's wheat crop is officially estimated to be not more than 236,500,000 bushels, or an average of less than 9 bushels per acre, while the average of a series of years has been 266,000,000 bushels.



than in 1885-86. While cotton and jute have furnished the usual large amounts for shipment, linseed and rapeseed fell off, because of poor crops. The exports of cotton twist spun in India to China are beginning to attain figures seriously alarming English spinners, but the reverse is the case with Indian cotton cloth, which the Chinese do not appear to take very readily. Of the total export of India the mother country received 39 per cent., as compared with 43 per cent. five years since, there being a marked tendency to ship direct from India to Continental Europe, and thus become less dependent on London.

American trade has, on the whole, not varied much:

Import from India.	Domestic export.
Fiscal year.	
1887.....\$18,890,090	\$3,902,047
1886.....17,247,825	4,350,141

The census of February 17, 1881, fixed the population of India at 253,891,821; it may safely be assumed to be 275,000,000 this year, the greater part of the people being hardworking small farmers capable of absorbing almost unlimited amounts of goods like petroleum, provided they combine good quality with cheapness. Hence the growing struggle between the American and Russian article is explained.

### Our New Navy.

The report of the Secretary of the Navy is among the most interesting documents accompanying the message, and is especially satisfactory in showing that good progress has been made by our manufacturers in providing the country with the plant necessary for the construction and armament of modern vessels of war. These establishments are now preparing to produce steel forgings for the heavier guns, armor for ironclad vessels, and the rapid-fire guns essential to a complete armament. The ease with which apparently grave difficulties were overcome is highly creditable to the skill and enterprise of American artisans. In the opinion of the Secretary our private shipyards can now produce war ships equal to those produced elsewhere, and perhaps superior to them, when these industries shall have become established. A high standard has been reached in the manufacture of material, possibly the highest ever obtained. The quality of the steel made on the Pacific Coast is especially commended. All of the unarmored vessels heretofore authorized by Congress are in course of construction. Their names are as follows:

Name.	Type.	Displacement, tons.
Charleston.....	Protected cruiser.....	3,730
Baltimore.....	Protected cruiser.....	4,408
Gunboat No. 1.....	Cruiser.....	1,700
Gunboat No. 2.....	Cruiser.....	890
Newark.....	Protected cruiser.....	4,083
Cruiser No. 4.....	Protected cruiser.....	4,324
Cruiser No. 5.....	Protected cruiser.....	4,083
Gunboat No. 3.....	Cruiser.....	1,700
Gunboat No. 4.....	Cruiser.....	1,700
Dynamite cruiser.....		725

The contract has also been awarded for a first-class torpedo-boat of 99 tons displacement. One of the two ironclad vessels authorized by Congress, each to cost not exceeding \$1,500,000, exclusive of armament, will be built upon the plans of the Department, and one upon those of the successful competitor. What disposition shall be made of the \$2,000,000 appropriated for coast and harbor defenses has not yet been determined. As the result of naval maneuvers designed to demonstrate the value of torpedo warfare, Secretary Whitney seems to have formed an unfavorable impression. The fact that torpedo-boats are of value only upon rare and accidental occasions, as, for example, in the night, or when the smoke of battle conceals them, seems to rule them out as a reliable weapon for coast and harbor defense. How to carry high explosive projectiles is therefore a question that is yet to be determined. A trial of the pneumatic dynamite guns upon the boat building for them will, in a few months, remove any questions respecting their efficiency. The development of this gun, we are told, promises to be the most notable event of the year.

On the question of an auxiliary navy the Secretary says: "The Department has informed itself fully of the different systems of organization for coast defense and naval reserves at present in force in foreign countries, and is prepared to formulate a general plan for a similar organization to meet the requirements and conditions of our own institutions. It should resemble in organization that of the militia or national guard, rest upon the foundation of local interests, contemplate the employment and rapid mobilization of steamers enrolled on an auxiliary navy list, and be calculated to produce the best results upon a comparatively small national expenditure. I ask for this question the earnest consideration of Congress." To be ready for any emergency, important additions to the shop machinery at the various navy-yards are recommended, more especially modern tools. The estimates for the fiscal year ending June 30, 1889, amount to about \$23,500,000. In a review of Secretary Whitney's paper the one conspicuous fact is that under the recent more liberal appropriations by Congress a new departure can be chronicled in naval construction, indicating that from henceforth there is promised a substantial development in the United States of materials and skilled industry applicable to this art which in the end may prove adequate to any emergency.

Mr. William Mulligan, for many years the maker of the famous "Uster" iron, died suddenly on Tuesday morning.

### The Coal Strike and the Pig Iron Situation.

(From an Occasional Correspondent.)

To the Editor of The Iron Age—DEAR SIR: I intimated in a letter a few weeks since to your valuable journal that, owing to the long continued strike at the coal mines of the Lehigh region, the make of pig iron would probably fall off to the extent of 100,000 tons in the iron-making districts heretofore using this coal almost exclusively. The strike having continued much longer than at first calculated on, this estimate is likely to prove too small. The men accustomed to run on the Lehigh coal were not so well used to the coal from the Wyoming and Lackawanna regions, and, in consequence, a number of furnaces have chilled and will be out of blast for some time to come. In others the make has been very greatly decreased; at present, as you will notice, only four of the 20 furnaces in New Jersey are in blast, while recently several in the Lehigh Valley have blown out, and several others are running very moderately, with their grades of iron improved. These furnaces now out will all probably be blown in again before the twenty odd new furnaces in course of construction in the Southern States are ready, so that, after all, the stoppage of these Northern furnaces (temporarily) will not be of the advantage first calculated upon to them. The stock of iron ores, notwithstanding the decreased consumption, has not increased at the furnaces or mines, and real good ores are really somewhat scarce and in better demand than anything else connected with iron making. Not many new openings of iron deposits have been made during the past two years, while many of the older ones have been worked to a very small profit for their owners. There is, however, just at present more attention being given to a survey of the ore bearing fields by interested parties than for years past, and in the near future I hope to inform you of some excellent finds in New Jersey and East Pennsylvania. Very truly yours,

December 12, 1887.

### The Coming Meeting of the Iron and Steel Institute.

The decision of the Council of the Iron and Steel Institute to hold an autumnal meeting of the Institute for 1888 in this country appears to have met with cordial approval among English and Continental ironmasters and engineers. The following is a list of members, just issued by Mr. J. S. Jeans, secretary, who have thus far accepted the invitation:

Adamson, Daniel, The Towers, Didsbury, near Manchester, (President).  
Addie, John, Langloan Iron Works, Coatbridge, N. B.  
Addyman, Thomas, West Gorton, Manchester.  
Akrill, Charles, Golds' Green Foundry, West Bromwich.  
Allen, Alfred H., 1 Surrey street, Sheffield.  
Anderson, C., 13 St. Helen's Villas, Stanstead Road, Forest Hill, London.  
Anderson, Samuel, Westbury Iron Works, Wiltshire.  
Angus, Robert, Lugal Iron Works, Cumnock, Ayrshire.  
Arrol, Thomas A., Genniston Iron Works, Glasgow.  
Ashbury, Thomas, 215 Plymouth Grove, Manchester.  
Baare, Fritz, Bochum, Westphalia.  
Bain, Sir James, 3 Park Terrace, Glasgow.  
Bain, J. R., Harrington Iron Works, Harrington, Cumberland.  
Bamlett, A. C., Thirsk, Yorkshire.  
Bantock, Thomas, Merridale House, Wolverhampton.  
Bargate, George, Barrow-in-Furness.  
Barlow-Massicks, Thomas, The Oaks, Millom, Cumberland.  
Barningham, Thomas, Corporation Street, Manchester.  
Barrow, James, Maesteg, Glamorganshire.  
Bayley, Jno. Clowes, 1 Queen Victoria street, London, E. C.  
Beard, George, Gartoch, Glasgow.  
Beckwith, Jno. H., Knott Mill Iron Works, Manchester.  
Bell, Charles, 21 Victoria Place, Stirling, Sussex.  
Bell, Chas. Wm., Yewhurst, East Grinstead, Sussex.  
Bell, Sir Lowthian, Bart., F.R.S., Rounton Grange, Northallerton (Past President).  
Bell, T. Hugh, Clarence Iron Works, Middlesboro'.  
Bell, Charles Ernest, Park House, Durham.  
Blair, Geo. MacLennan, Clutha Iron Works, Glasgow.  
Bleckly, C. A., 61 King William street, London, E. C.  
Bleckly, W. H., Warrington.  
Bradley, B. G., Parkfield House, Wolverhampton.  
Brook, A., 110 Cannon street, London, E. C.  
Brooke, Edward, Edgerton, Huddersfield.  
Brown, Joseph C., Hazel Holm, Cleator, via Carnforth.  
Bull, James, The Brampton, Newcastle-under-Lyme.  
Burnyatt, William, Millgrove, Whitehaven.  
Bush-Dudley, J. C., Fort House, South Molton, North Devon.  
Butler, Edmund, Kirkstall Forge, Leeds.  
Butler, Isaac, Panteg House, near Newport, Monmouthshire.  
Byrne, Samuel Henry, The Farre Close, Brighouse, Yorkshire.  
Carbutt, E. Hamer, 19 Hyde Park Gardens, London (president of the Institution of Mechanical Engineers).  
Cawley, George, 70 Market street, Manchester.  
Chapman, John G., Tower Hill, Middleton-On-Row, Darlington.  
Cleminson, Jas., 7 Westminster Chambers, London, S. W.  
Cochrane, Charles, Green Royde, Pedmore, near Stourbridge.  
Coghlan, J. H., Grosvenor House, Headingley, Leeds.  
Copestake, Sampson, Burgess Hill, Sussex.  
Craven, Jno., Craven Bros., Manchester.  
Crippin, Edwd. Frederick, Bryn Hall Collieries, near Wigan.  
Crossell, S., Spring Bank, North Side, Workington.  
Crowther, Clement, Stour Vale Iron Works, Kidderminster.

Crum, John, Lowther Hematite Iron Works, Workington.  
Cuninghame, John, 127 St. Vincent street, Glasgow.  
Cuninghame, J. C., Craigends, Johnstone, N. B.  
Daalen, R. M., Düsseldorf.  
Dalton, George, The Yews, Headingley, Leeds.  
Dalzell, Wm., Whitehaven.  
Daniel, E. Rice, Cwmgelly, Swansea.  
Darby, J. H., Brymbo Iron Works, near Wrexham.  
Davie, Thomas, Waverley Iron and Steel Works, Coatbridge, N. B.  
Davis, J. Henry, 147 Cannon street, London.  
Davy, David, Broom Croft, Parkhead, Sheffield.  
Dennis, W. F., 101 Leadenhall street, London, E. C.  
Dickinson, Samuel, Newbridge, Wolverhampton.  
Dixon, Henry E., Audley, Surbiton Hill Park, Surbiton.  
Dove, George Jr., Redbourn Hill Iron Works, Frodingham, near Doncaster.  
Eaton, Robt. Renton, President Works, Sheffield.  
Easton, Edward, Delahay Street, Westminster, S. W.  
Edge, John H., Coalport Works, Shifnal, Salop.  
Ellacott, Robert H., Engineering Works, Plymouth.  
Ellis, T. L., North British Iron Works, Coatbridge, N. B.  
Evans, Christmas, Heolgerrig, Merthyr Tydfil.  
Farnworth, William, Swindon Iron Works, Dudley.  
Feldmann, Rudolph, 116 St. Vincent street, Glasgow.  
Fisher, M. F., 56b., Kaiserstrasse, Magdeburg, Germany.  
Fossick, William G., 86 Cannon street, London, E. C.  
Fry, Theodore, M. P., Darlington.  
Garrett, Geo., Waverly Iron and Steel Works, Coatbridge, N. B.  
Geen, Geo., Iron Villa, Gold Tops, Newport, Monmouthshire.  
Gilchrist, P. C., Ruscombe, Willoughby Road, Hampstead, N. W.  
Gilmour, Allan, Maryport Hematite Iron and Steel Co., Maryport.  
Glover, Ben Bradshaw, Beech Bank, Newton-le-Willows, Lancashire.  
Gordon, Joseph G., Queen Anne's Mansions, S. W.  
Goransson, A. H., Steel Works, Sandviken, Sweden.  
Gossell, O. Jr., 110 Cannon street, London, E. C.  
Green, Edward Llewellyn, Fairy Land, Neath, South Wales.  
Greenwood, William Henry, Firth College, Sheffield.  
Gutham, Max, I Kantgasse 6, Vienna, Austria.  
Hadfield, Robert A., Ashdell, Sheffield.  
Hall, J. F., Brightside Works, Sheffield.  
Hammond, Robert, Cannon street, London, E. C.  
Harrison, G. K., Hagley, near Stourbridge.  
Hatton, Geo., Hagley, Stourbridge.  
Hay, A. M., 111 Union street, Glasgow.  
Head, Jeremiah, Middlesboro'. (Past President of the Institution of Mechanical Engineers).  
Heath, James, Biddulph Iron Works, Stoke-on-Trent.  
Helson, Robt., 47 New Lowther street, Whitehaven.  
Heywood, H., Cardiff.  
Hickman, Alfred, Spring Vale Furnaces, Wolverhampton.  
Hodges, P., 238 Barnsley Road, Sheffield.  
Holt, Henry Percy, The Cedars, Didsbury, Manchester.  
Homer, Charles J., Stoke-upon-Trent.  
Hosking, Richard, Clarence House, Dalton-in-Furness.  
Houghton, John, The Beeches, Moore, near Warrington.  
Howard, James, Clapham Park, Bedfordshire.  
Howie, Henry, Harrington, Cumberland.  
Hughes, Wm., 19 Lionel street, Birmingham.  
Hulse, J. W., Brookside, Didsbury, Manchester.  
Huntington, Professor, King's College, London, W. C.  
Ianson, J. C., Rise Carr Rolling Mills, Darlington.  
Jackson, W. F., Bowling Iron Works, Bradford, Yorkshire.  
Jenkins, Sir J. J., The Grange, Swansea.  
Jenks, Isaac James, Cleveland Iron Works, Wolverhampton.  
Jenks, Walter, Minerva Works, Horseley Fields, Wolverhampton.  
John, William, Barrow Shipbuilding Works, Barrow.  
Johnson, W. H., 26 Lever street, Manchester.  
Johnston, James, Fairfield road, Buxton.  
Kellett, William, 24 King street, Wigan.  
Kenrick, Geo. H., Wheelstone, Somerset road, Edgbaston, Birmingham.  
Kirk, Henry, Workington.  
Laird, James, Sunderland.  
Lancaster, Joshua, Rhewl House, Mostyn, Flintshire.  
Larsen, Jno. Daniel, 24 Belvedere Road, Upper Norwood, S. E.  
Leigh, J., Brimington Hall, Stockport.  
Lewis, H. W., Treherbert, near Pontypridd.  
Lewis, Sir William Thomas, Mardy, Aberdare.  
Lindheim, W. Von, Lugeck 3, Vienna.  
Lithman, Jos. E., 14 Fenchurch street, E. C.  
Ljungberg, E. J., Falun, Sweden.  
Lloyd, Samuel, Sparkbrook, Birmingham.  
Long, A. de Lande, Stockton-on-Tees.  
Lowood, John Grayson, Ganister Works, Sheffield.  
Lueg, H., Düsseldorf, Germany.  
MacCarthy, G. E., Ashfield House, Newcastle-on-Tyne.  
Macco, H., Siegen, Germany.  
MacLennan, Joseph, Bilbao, Spain.  
Manby, Cordy, Dudley.  
Margery, Jules, Aachener Hütte, Rothe Erde, near Pay-la-Chapelle.  
Marsden, Benjamin, London road, Manchester.  
Martell, B., Lloyd's, White Lion court, Cornhill, London.  
Martin, Edward P., Dowlais, Glamorganshire.  
Masey, W. H., Twyford, Berks.

Maybery, Joseph, Oldcastle Tin Plate Works, Llanelly.  
McCowan, Wm., Roseneath, Whitehaven.  
McDonald, Wm., Fenchurch street Station, London, E. C.  
McLaren, C. B., 3 New Court, Lincoln's Inn.  
McLellan, George S., Clutha Steel Works, Glasgow.  
McClelland, Andrew S., 115 St. Vincent street, Glasgow.  
Molineaux, W., Bulls Bridge Iron Works, Moxley.  
Monks, F., Brooklands, Warrington.  
Morris, Claude John, The Mount, Altrincham.  
Mosley, Lt.-Col. Paget, 81 Warwick road, Earl's Court, London, S. W.  
Nash, H. B., 8 Ullet road, Liverpool.  
Neilson, Walter, Jr., Conservative Club, Glasgow.  
Norbury, William Edward, Knott Mill Iron Works, Manchester.  
Ogilvie, A. G., 4 Great George street, London, S. W.  
Ogle, Percy G., Ynisedwyn Iron Works, Swansea.  
Otto, Dr. K. Dahlhausen, Ruhr, Germany.  
Page, John, Wednesfield Park, Wolverhampton.  
Parker, William, Lloyd's, White Lion Court, Cornhill, London.  
Parkes, Henry P., Tipton Chain, Cable and Anchor Works, Tipton.  
Parkes, Ebenezer, Atlas Works, West Bromwich.  
Pattison, John, Naples, Italy.  
Peake, John Nash, the Tilerie, Tunstall, Staffordshire.  
Pearson, Jos. H., Handsworth, near Birmingham.  
Pearson, Thos. H., Dallam Forge Company, Wigan.  
Pease, Henry Fell, M. P., Darlington.  
Pease, Jos. A., 92 Northgate, Darlington.  
Peile, Wm., Stainburn, Workington.  
Pepper, Joseph E., Clarence Iron Works, Leeds.  
Piedbœuf, Gustave, Aix-la-Chapelle.  
Platt, James, Atlas Iron Works, Gloucester.  
Poensgen, Rudolph, Düsseldorf, Germany.  
Pope, Samuel, Tinsley House, Tinsley, Sheffield.  
Pourel, Alexandre, Saltburn-by-the-Sea.  
Putnam, William, Darlington Forge, Darlington.  
Benton, Benjamin Mann, Savile street, Sheffield.  
Richards, E. Windsor, Middlesboro'.  
Richards, Job, Havelock House, Shirley road, Acoek's Green, Birmingham.  
Richardson, Joseph, Stockton-on-Tees.  
Ridley, J. C., 3 Summerhill Grove, Newcastle-on-Tyne.  
Riley, Edward, 2 City Road, Finsbury Square, London, E. C.  
Riley, James, Glasgow.  
Robinson, T. N., Mount Faling, Rochdale.  
Rocour, G., 18 Avenue Rogier, Liège, Belgium.  
Rollason, James, Bromford Wire Mills, Erdington, Birmingham.  
Rummen, Francis, 235 Elgin Avenue, Maida Vale, W.  
Shanks, Thomas, Jr., Johnstone, N. B.  
Schulz, G., Bochum, Westphalia.  
Schultz, George, Botolph House, Eastcheap, London, E. C.  
Senior, George, Pond's Forge, Sheffield.  
Share, George W., 72 King William street, London, E. C.  
Simon, Henry, 20 Mount street, Manchester.  
Simpson, J. S., Harrington Iron Works, Harrington, Cumberland.  
Smith, A. Pye, 2 Victoria Mansions, Westminster, London.  
Smith, Fred, Caledonia Works, Halifax, Yorkshire.  
Smith, G. Jackson, Clyde Street Works, Sheffield.  
Smith, Joseph H., Summerhill, Kingswinford, near Dudley.  
Smith, Robert, Castle Hill, Sheffield.  
Smith, W. Ford, Greasley Iron Works, Manchester.  
Snelus, G. J. F. R. S., West Cumberland Iron and Steel Works, Workington.  
Sparrow, J. W., Beckminster, Wolverhampton.  
Spencer, J. W., Newburn Steel Works, Newcastle-on-Tyne.  
Stead, J. E., 5 Zetland road, Middlesboro'.  
Steer, Edward, Castle Works, Tydee, near Newport.  
Sterne, Louis, 2 Victoria Mansions, Westminster, S. W.  
Steven, Thos., Milton Iron Works, Glasgow.  
Stevenson, John, Acklam Iron Works, Middlesboro'.  
Stoddart, Charles John, Park Gate Iron Works, Rotherham.  
Storey, Sir Thomas, M. P., Lancaster.  
Storr, Walter W., Landore R. S. O., South Wales.  
Strang, J. H., Lochburn Iron Works, Glasgow.  
Strick, Jno., Silverdale, North Staffordshire.  
Sturrock, David, Carntyne Iron Co., Glasgow.  
Summers, James W., Globe Iron Works, Staleybridge.  
Sumner, William, Brazenose street, Manchester.  
Thielen, Alex., Phoenix Iron Works, Ruhrort, Rhenish Prussia.  
Thomas, R. B., Lydbrook, Gloucestershire.  
Thomas, William, Bryn Awel, Aberdare.  
Thomlinson, Wm., Seaton Carew, West Hartlepool.  
Thompson, S. Jno., Manor Iron Works, Wolverhampton.  
Tinn, Joseph, Bristol Bank Buildings, Bristol.  
Trubshaw, Ernest, Western Tin Plate Works, Llanelly, South Wales.  
Tucker, A. E., Holly street, Smethwick.  
Turner, Thomas, Congreaves Iron Works, near Birmingham.  
Valentine, Charles J., Marshside, Workington.  
Vivian, John, Whitehaven.  
Wadham, Edward, Milwood, Dalton-in-Furness.  
Wake, Henry H., River Wear Commission, Sunderland.  
Walker, William, Saltburn-by-the-Sea, Yorkshire.  
Walrand, Charles, Longwy, Meurthe-et-Moselle, France.  
Wells, Charles, Moxley Steel and Iron Works, near Wednesbury.  
Whitehead, John, Penwortham Priory, Preston, Lancashire.

Whitwell, William, Thornaby Iron Works, Stockton-on-Tees.  
Wilkinson, George, Tivdale Sheet Mills, Tipton.  
Willams, J. W., Manchester.  
Williams, John, Fraeside, Newport, Mon.  
Williams, R. Price, 38 Parliament street, London.  
Williams, Winfred, Newhall Works, Birmingham.  
Williams, William, Forest Upper, Stutton, Swansea.  
Williamson, Richard, Workington, Cumberland.  
Wilson, Matthew G., 3 Oxford street, Glasgow.  
Wood, B. G., Wardsend Steel Works, Sheffield.  
Woodall, John W., Scarborough.  
Wright, A. Leslie, 2 Hawthorn terrace, Newcastle-on-Tyne.  
Ybarra, Señor Don Jose A. de, Ronda de Recoletos 3, Madrid, Spain.  
Young, James, Lowmoor Iron Works, near Bradford.  
Zeitiz, Th., St. Peter's Close, Sheffield.

### The Tariff Outlook in Washington.

(From Our Regular Correspondent.)

WASHINGTON, D. C., Dec. 13, 1887.

At the first blush the President's message was received with a variety of comment defined in degrees of favor or disfavor by party lines. It was, however, with a surprise even to the ultra leaders of the majority of the House. In aggressiveness, they quietly hinted it was a little beyond the safe limits of equivocation on economic doctrines affecting the tariff. The President, in order to make the issue more clear and distinct, disencumbered his message of all matters of recommendation to Congress. Such men as Speaker Carlisle are more puzzled by its enunciations than those who were less in the Executive confidence before the document came out. The Speaker had been in frequent conference on the subject, and Mr. Randall, on the Sunday night before the assembling of Congress, was called into consultation. Both gentlemen therefore looked for a document which would afford them a common ground of discussion in a direct line to harmony. The Speaker, in his inaugural, took a very conservative and hopeful view of the situation and aimed to putting his radical friends in a frame of mind which would give a friendly reception to the expected conservative views of the President. The message was therefore a surprise, as it brought the points at issue no nearer a solution than they were before. After a week's discussion of the message, pro and con, the more it is examined the further apart the two wings of the majority find themselves. They have not abandoned hope, however, of reaching a compromise measure, but the terms of agreement are as vague as they were before the President laid down the Administration doctrine.

There is one effect which the message has had, and that is to force Mr. Blaine into the contest. The statesman from Maine came promptly to the front from his engagements at the French capital and announced his platform. The politicians have now pretty generally settled in their minds that the contest of 1888 will be fought under the leadership of the standard bearers of 1884, and upon an issue laid down by themselves six months in advance of the conventions or the platforms. The Speaker is now engaged in making up the personnel of the two important Committees on Ways and Means and Appropriations, so that they may devote their attention during the Christmas recess to preparing a surplus reduction bill and the general appropriation bills, to be ready as soon as practicable after the holidays. The chairmanship of Ways and Means, from all indications, will be given to L. Q. Mills, of Texas. That gentleman called upon the Speaker a few days ago and assured him that he would not stand in the way of any compromise measure which the Speaker might favor, even to the incorporation of a certain amount of internal revenue repeal. The Speaker told him that great opposition had been brought against his appointment, but that with such an understanding this would simplify his course very materially.

A story has been circulated that Mr. Randall called upon the Speaker, and had an understanding that he would not antagonize revenue revision in view of his retention at the head of appropriations. Mr. Randall authorizes the statement that no such assurance was given, and Mr. Carlisle says that such a suggestion would have been repelled on sight.

The course which Mr. Randall has decided to pursue is one of armed neutrality, so to speak. He will simply await developments. He wishes to see what the Mills Committee on Ways and Means will have to offer. In the meantime Mr. Randall is preparing a bill of his own, so as to be ready for emergencies. The metal schedule has more reference to classification of metals for duties than fixing rates which will materially differ from those which now exist on the same grades. The most determined controversy will be on the placing of iron ore on the free list or giving it a compromise rate of 50 cents a ton. With that as a basis on the plea of making things relative the tariff reducers will demand \$5 or \$5.50 cents a ton on pig iron and about \$13 on steel rails. The most determined prejudice, even among Southern representatives who favor keeping up the metal duties, exists against steel. They have an idea that they are giant monopolies which have been nurtured beyond the limits of all other industries until they have reached a sturdy growth and opulence which can afford to yield something to diminish the revenues.

Secretary Endicott has awarded the contract for excavating the Harlem Ship Canal to John Satterlee & Co., of Englewood, N. J., at his bid of 93 cents per cubic yard for material above water and \$1.13 per cubic yard for material under water. The appropriation for this work amounts to \$400,000.



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	R. Wallace & Sons Mfg. Co., 21 Park Place, N. Y.	40
<b>Dampers</b>	Shepard Hardware Co., Buffalo, N. Y.	52
<b>Daubers</b>	Peasbody & Parks, Troy, N. Y.	7
<b>Discount Book</b>	Williams David, 66 and 68 Duane, N. Y.	42
<b>Dear Checks</b>	Graves, E. E., Bridgeport, Conn.	12
	Sargent Co., New York and New Haven	31
<b>Door Hangers, House and Barn</b>	Lane Bros. Poughkeepsie, N. Y.	42
	Stearns E. C. & Co., Syracuse, N. Y.	52
<b>Door Knobs</b>	Boston Knob Co., Boston, Mass.	36
<b>Drilling Machines</b>	Dallitt Thos. H. & Co., Philadelphia	51
	Wiley & Russell Mfg. Co., Greenfield, Mass.	52
	Universal Radial Drill Co., Cincinnati	52
<b>Drop Forgings</b>	Becher & Peck, New Haven, Conn.	51
	Merrill Bros., 26 First, Brooklyn, E. D.	46
	Philadelphia Forge Co., Phila., Pa.	48
	Stearns & Urging Co., Scranton, Pa.	49
	Wyman & Gordon, Worcester, Mass.	48
<b>Drop Presses</b>	Becher & Peck, New Haven, Conn.	51
	Conn. Press Co., Middletown, Conn.	52
	Waterbury Barrel Foundry and Machine Co., 10 Barclay, N. Y.	46
<b>Edge Tools, Makers of</b>	White L. & J., Buffalo, N. Y.	12
<b>Engin. &amp; Builders</b>	Hamblin & Russell Mfg. Co., Worcester	12
<b>Electric Lighting</b>	The Brush Electric Co., Cleveland, O.	45
<b>Electric Dynamo Machines</b>	Zucker & Levitt Chemical Co., 538 to 540 Broadway, N. Y.	29
<b>Electrical Supplies</b>	Wollensak J. T., Chicago, Ill.	50
<b>Electro-Platers</b>	Boardman L. & Son, East Haddam, Ct.	10
<b>Elevators, Makers of</b>	Wheeler & Cunningham, Philadelphia, Pa.	51
	Stearns & Parrish Machine Co., Phila.	50
<b>Emery Paper, Cloth, &amp;c.</b>	Walpole Emery Mills, South Walpole, Mass.	52
<b>Emery Wheels</b>	Walpole Emery Mills, South Walpole, Mass.	52
	Emery Wheel & Packing Co., 19 Park Row, N. Y.	19
	Northampton Emery Wheel Co., Leeds, Mass.	47
	Springfield Glue and Emery Wheel Co., Springfield, Mass.	48
	The Pacific Co., Emery Wheel Co., 10 Barclay, N. Y.	47
	Mass. Emery Wheel Co., Waltham, Mass.	40
<b>Enamelling</b>	Enamel Enamel Works, Groton, N. Y.	44
<b>Engineering Implements &amp; Supplies</b>	Wheeler & Co., Philadelphia, Pa.	4
<b>Engineers</b>	Gordon, Strobel & Laureau, Phila., Pa.	5
<b>Engineers and Contractors</b>	Leah & Co., 100 Broadway, N. Y.	4
	McKenna, Ryan & Sons, Pittsburgh, Pa.	6
	Swindell Construction Co., Pittsburgh, Pa.	12
	W. Van Harlingen, Phila., Pa.	5
<b>Engines, Gas</b>	Clerk Gas Engine Co., Philadelphia, Pa.	51
	Manning A. & Co., 47 DeY, N. Y.	51
<b>Engines, Steam, Makers of</b>	Partridge & Co., 10 Barclay, N. Y.	50
	Farquhar, A. B. & Son, York, Pa.	47
	Leffel Gas Co., Springfield, O.	50
	Wheeler & Cunningham, Philadelphia, Pa.	51
	N. Y.	50
	Payne E. W. & Sons, 4 DeY, N. Y.	50
	Wheeler & Cunningham, Philadelphia, Pa.	51
	The Norwalk Iron Works Co., S. Norwalk, Conn.	50
	Wood Tm. & Co., Youngstown, O.	50
	Twiss N. B., Williamsburg, W. Va.	51
	Wetherill Robt. & Co., Chester, Pa.	51
<b>Engravers</b>	Keys & Woodbury, Worcester, Mass.	15
<b>Exhaust Pipe Condensing Heads</b>	Miller, Albany, 109 Liberty, N. Y.	13
<b>Excavators</b>	Chishawsky A., 14 DeY, N. Y.	14
<b>Flakes, Makers of</b>	John Sommer's Son Newark, N. J.	46
<b>File and Cutter</b>	Dever & Deming Mfg. Co., Salem, Ohio	9
<b>Fire-Water Heaters</b>	Wheeler & Cunningham, Philadelphia, Pa.	51
<b>Forgings, Wrought Iron</b>	Champion Iron Fence Co., Kenton O.	3
<b>Fries, Importers of</b>	Montgomery & Co., 105 Fulton, N. Y.	15
	W. P. J. & Co., N. Y.	44
<b>Furnaces and Ranges, Manufacturers of</b>	Arnett & H. S., 41 & 43 Richmond, Phila.	8
	Chesler Fire Works, Norwich, Conn.	8
	Wheeler & Cunningham, Philadelphia, Pa.	51
	Barton Smith Co., Philadelphia, Pa.	8
	McCaffrey & Bro., 1735 & 1734 N. 4th, Phila.	8
	Wheeler & Cunningham, Philadelphia, Pa.	51
<b>Fire Bricks, Makers of</b>	Argner & O'Brien, Philadelphia, Pa.	45
	Argner James, Pittsburgh, Pa.	45
	Wheeler & Cunningham, Philadelphia, Pa.	51
	Reischer B. & Sons, 40 E. Houston, N. Y.	45
	Jaure R. & Son, 40 E. 23d, N. Y.	45
	Wheeler & Cunningham, Philadelphia, Pa.	51
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<b>Forgings, Iron and Steel.</b>	Hicks & Dickey, Philadelphia, Pa.	4
	Miller Forge Co., Pittsburgh, Pa.	49
	Saratoga Forge Co., Bridgeport, Conn.	49
<b>Foundry Facilities.</b>	Paterson & Co., 114 Beech, Phila.	5
	S. Obermayer Foundry Supply Mfg. Co., Cincinnati, O.	40
<b>Foundry Riddles.</b>	Tedes & Pugh, N. Y.	6
<b>Foundry Supplies.</b>	S. Obermayer Foundry Supply Mfg. Co., Cincinnati, O.	40
	Paterson & Co., 114 Beech, Phila.	5
<b>Frame Pulleys.</b>	Palmer Mfg. Co., Troy, N. Y.	38
<b>Friction Clutches.</b>	Jas. Smith Wooden Mch. Co., Phila., Pa.	46
	Moore & White, Philadelphia, Pa.	51
<b>Friction Pulleys.</b>	Sandy Hill Iron and Brass Works, Sandy Hill, N. Y.	51
<b>Furnace Hoists.</b>	Stokes & Parrish Machine Co., Phila., Pa.	50
<b>Furnace Lamps.</b>	Taylor & Boggis Foundry Co., Cleveland, O.	10
<b>Gas and Steam Fitters' Supplies.</b>	Pancost & Maule, Philadelphia, Pa.	48
<b>Gear Cutters.</b>	D. E. Whitton Mach. Co., New London, Conn.	51
<b>Glass Boards.</b>	Little & Kent, Cleveland, O.	42
<b>Glass Cutters.</b>	Andrews, Thos. J., Philadelphia, Pa.	34
	Monroe, S. G., Bristol Conn.	12
<b>Glue.</b>	Large Liquid Glue and Cement Co., Gloucester, Mass.	15
	Upton Geo., Boston, Mass.	47
<b>Grindstone Dressing Machinery.</b>	Blake & Johnson, Waterbury, Conn.	3
<b>Grindstones.</b>	Cleveland Stone Co., Cleveland, O.	40
	Lake Huron Stone Co., Detroit and Chicago.	40
	Wood, Walter R., 288 and 285 Front, N. Y.	40
<b>Gunpowder, Makers of.</b>	Lafayette Hand Powder Co., 20 Murray, N. Y.	40
<b>Hack Saws.</b>	Thompson H. G. & Sons, New Haven, Conn.	47
<b>Hammers.</b>	Buffalo Hammer Co., Buffalo, N. Y.	47
<b>Hammers, Steam.</b>	Bradley & Co., Syracuse, N. Y.	12
<b>Hand Force Pumps.</b>	Union Mfg. Co., 103 Chambers, N. Y.	7
<b>Hardware Manufacturers.</b>	Doscher, Martin, 38 Chambers, N. Y.	13
	Field Alfred & Co., 93 Chambers, N. Y.	10
	Jacobus, W. H. & Co., 90 Chambers, N. Y.	12
<b>Hardware Merchants.</b>	Bingham W. & Co., Cleveland, Ohio	34
	Union Mfg. Co., 103 Chambers, N. Y.	7
<b>Hardware Mfrs. Agents.</b>	W. Wallace & Sons Mfg. Co., 37 Park Place, N. Y.	40
<b>Hardware Shelf Boxes.</b>	Green S. H., 22 Park Place, N. Y.	35
	Jones, Jesse & Co., Philadelphia, Pa.	35
<b>Hardware Specialties.</b>	Acme Shear Co., Bridgeport, Conn.	5
	Bingham W. & Co., Cleveland, Ohio	34
	Enterprise Mfg. Co., Philadelphia, Pa.	35
	Hass H. & Co., 402 and 404 E. 30th, N. Y.	10
	Rex A. C. & Co., Philadelphia, Pa.	13
	Saxton E. R., Buffalo, N. Y.	52
	Shepard Hardware Co., Buffalo, N. Y.	52
	The Wire Goods Co., Worcester, Mass.	2
	Underhill, Clinch & Co., 91 Chambers, N. Y.	10
<b>Hardware, Theatrical.</b>	Martin Samuel, 27 Eighth av., N. Y.	7
	Wollensak J. F., Chicago, Ill.	28
<b>Harness Snaps.</b>		
	Covert Mfg. Co., West Troy, N. Y.	47
<b>Hay Carriers.</b>	Ayers F. E. & Bro., Ashland, O.	7
<b>Hay Knives.</b>	Raymond Mfg. Co., East Wilton, Me.	8
	North Wayne Tool Co., Hallowell, Me.	8
	The New Mfg. Co., Canton, Ohio.	8
<b>Hinges.</b>	Union Mfg. Co., 103 Chambers, N. Y.	7
<b>Hog Rings.</b>	Chambers, Bering & Quinlan Co., Decatur, O.	9
<b>Holisting Machines.</b>	Bor Alfred & Co., 314 Green, Phila.	49
	Chambers, Bering & Quinlan Co., Decatur, O.	9
	Morse, Williams & Co., Philadelphia, Pa.	51
	Sellers Wm. & Co., Philadelphia, and 79 N. 3rd, Phila.	49
	Teal Holist Co., Philadelphia.	49
	Traud A., Newark, N. J.	50
<b>Horse Nails, Makers of.</b>	Stearns Horse Nail Co., West Isl., N. Y.	34
	Stearns Horse Nail Co., Vergennes Vt.	34
<b>Horse Shoes, Makers of.</b>	Reynolds Horse Shoe Co., Poughkeepsie, N. Y.	4
	Reynolds Horse Shoe Co., Troy, N. Y.	4
	The Burden Iron Co., Troy, N. Y.	4
<b>Hot-Blast Stoves.</b>	Wither James F., Pittsburgh, Pa.	4
<b>Hydrants, Makers of.</b>	Dudgeon Richard, 24 Columbia, N. Y.	51
	Watson & Stillman, 40 E. 43d, N. Y.	51
<b>Hydraulic Jacks.</b>	Dudgeon Richard, 24 Columbia, N. Y.	51
	Watson & Stillman, 40 E. 43d, N. Y.	51
<b>Indurated Fibre War.</b>	Woolen & Loom Co., 110 Chambers, N. Y.	32
<b>Injectors.</b>	Woolen & Loom, 108 Liberty, N. Y.	15
<b>Insurance, Boiler.</b>	Harford Steam Boiler Inspection & Insurance Co.	50
<b>Iron, Manufacturers Agents.</b>	Co Justice, Jr. & Co., 335 Philadelphia, Phila.	5
	Hoffman J. W. & Co., 208 S. 4th, Phila.	5
	Levin Henry & Co., Philadelphia, Pa.	5
	Allen Wood Co., Philadelphia.	5
	Burden Iron Co., Troy, N. Y.	4
	Leonard John & Co., West Isl., N. Y.	34
	Monmouth Valley Iron Co., Youngstown, O.	4
	Moorehead & Co., Pittsburgh, Pa.	4
	Montour Iron & Steel Co., Danville, Pa.	44
	Pottstown Iron Co., Pottstown, Pa.	40
	Riverside Iron Works, Wheeling, W. Va.	7
	Stearns Horse Nail Co., West Isl., N. Y.	34
	The Wilmet & Hobbs Mfg. Co., Bridgeport, Conn.	49
	Troy Steel and Iron Co., Troy, N. Y.	44
	W. H. Hutton, Wm. E. & Co., Hudson, N. Y.	4
<b>Iron and Steel, Swedish.</b>	Lewander & Co., Boston, Mass.	45
	Power, Newell & Co., Philadelphia, Pa.	45
	W. H. Hutton, Wm. E. & Co., Liberty, N. Y.	45
<b>Iron Brokers.</b>	Scott Edward J., Philadelphia, Pa.	6
	W. H. Hutton, Wm. E. & Co., Liberty, N. Y.	45
	W. H. Hutton, Wm. E. & Co., Philadelphia, Pa.	6
<b>Iron Commission Merchants.</b>	John L. Hogan, Philadelphia, Pa.	5
	J. J. Tannal & Co., Philadelphia.	5
	Lundberg George, 430 Walnut, Philadelphia.	5
	W. H. Hutton, Wm. E. & Co., Philadelphia, Pa.	6
<b>Iron Menbers.</b>	Abbott Jere & Co., N. Y. and Boston.	45
	Cooney Daniel F., 88 Washington, N. Y.	45
	Co Justice, Jr. & Co., Philadelphia.	5
	Hoffman J. W. & Co., Philadelphia.	5
	Wm. R. & Co., Philadelphia.	5
	Hamrod Chas. & Co., Chicago, Ill.	4
	Kealey Jerome & Co., Philadelphia, Pa.	45
	Kendall, F. W. & Co., Boston, Mass.	45
	Langford Gustaf, 38 Kilby, Boston.	45
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## Iron Making in the Birmingham District.—II.

### THE FUEL.

Until now the bulk of the coke used in the Birmingham district has been made from coal from the Warrior field, the Pratt mines and coke works, owned by the Tennessee Coal, Iron and Railroad Company, furnishing by far the largest supply. Out of the 1075 ovens in Alabama at the close of 1885 914 ovens were in the Warrior coal field. It is estimated that at the close of 1886 there were in the neighborhood of 1300 ovens in Alabama, of which nearly 1100 ovens were in the field mentioned. Fully 1000 ovens were then building, and more are under construction now. In spite of this activity the furnaces of the Birmingham district have frequently suffered during the past year, like those in other sections of the South, from a scarcity of coke. The pressure on the producers of the latter has been enormous, and it is probably not a matter for surprise that under the circumstances the quality has not been up to the standard which the character of the coal might warrant. Usually the ash varies from 9 to 12.5 per cent., while the sulphur fluctuates between 0.75 and close to 2 per cent. The appearance of some of the coke in the stock piles of some of the furnaces visited was not, however, calculated to impress an iron-master favorably with the fuel. We repeat that this is undoubtedly an exceptional condition of affairs, not altogether unknown in the most famous district of Pennsylvania in times when a heavy demand and high prices are apt to make the producer less careful and the consumer far less critical. Yet it is an important matter, since it seriously injures furnace-work, and has been the source of much of the irregularity in running which has characterized all but a few of the works during the year. It is a matter easily mended when supply and demand become more evenly balanced. If the average of coke consumption, including wastage, &c., for the furnaces were known, it would probably show higher figures than even some of the furnaces are now willing to admit. But it would be a dangerous proceeding to base upon such figures any conclusions bearing on the real capacity of the works to meet the markets under ordinary conditions. Some of the coke examined had freckled appearance from small particles of slate which probably could be easily got rid of by careful mining and by washing. The question of a fuel supply is bound to remain a disagreeable one for Birmingham iron producers for some time to come, and will have some effect upon the quantity of pig iron coming from that quarter to the markets of the country during 1888.

Mr. John S. Kennedy, of Tuscaloosa, has published in the Birmingham Age the following estimate of the output of coal in the district:

	Tons daily.
Pratt mines.....	2,500
Coalburg, G. P. R. R.....	800
Henry Ellen, G. P. R. R.....	300
Woodward, estimated.....	500
New Castle.....	2.0
Alabama Connelville, estimated.....	2,000
Blackton, estimated.....	1,000
Four small mines on L. and N. R. R.....	400
Total.....	7,750

It is probable that these figures are excessive. Thus the figure for the Alabama Connelville Company is really only 200 tons, so that the total ought to be 5050 tons. Yet the output mentioned would not be adequate to supply the coke ovens for the blast furnaces built and building alone, not to speak of locomotive, steam raising, rolling mill and domestic use of the large territory tributary to the Warrior, Coosa and Cahaba fields. With the iron plants now in operation and those building at Birmingham, Trussville, Sheffield, Florence, Anniston and Gadsden running at full capacity the coke consumption annually would not be less than 1,400,000 gross tons per annum, which would call for about 3500 ovens and over 2,250,000 tons of coal. In spite of the efforts made by the local producers to largely increase their output, the progress made in that direction, while highly creditable, has not been great enough to avoid occasional coke scarcity, although during the year the consumption has not increased at anything like the rate which will follow the beginning of operations by the furnaces now building. The Sheffield furnace now completed has been forced to go to Pocahontas, Va., for fuel. Of the new furnace plants building the majority near Birmingham are putting in their own ovens. At Bessemer 275 are going up, at the Thomas Furnace 150, at North Birmingham 250, at Trussville 200, while the Eureka Company are putting up 50 new ovens at Helena, the Woodward Company are adding 150 ovens to their plant of 143, and the Woodstock Company are building 300 ovens at Blackton. The Ensley furnaces will depend upon the Pratt mines adjacent to them for coke, when there will be 800 ovens in operation by the 1st of January. The furnaces in the vicinity of Birmingham and some of those at a distance are therefore preparing for the future. But it may be questioned whether, with all the activity in opening up new coal territory, the mines will be sufficiently developed to get ahead of the demand with their capacity for some time to come. In the Warrior field at least one of the companies has had a vexatious experience with a fault, causing a delay and a costly search for the faulted vein. It is within the range of possibilities that a similar trouble may check the speed with which others open up new territory, in fact the latest advices state that a leading company has lately struck a fault.

So far as the fuel consumption of the furnaces in the Birmingham district is concerned, the figures vary widely. As low as 1.25 tons of coke is claimed, but the general range probably lies nearer 1.50 to 1.75, with the average closer to the latter figure than the former.

### LIMESTONE.

The principal sources of supply of limestone for the furnaces of the Birmingham district are the quarries recently opened by the Birmingham Mining and Mfg. Company in the vicinity of the town, and at Blount Springs. The stone at the former point carries from 95.25 to 99.25 per cent. of car-

bonate of lime, with about 1.5 per cent. of silica as the average. The haul to the furnaces averages about 8 miles, and the selling price is between 65 and 75 cents a ton. The quantity used by the furnace companies fluctuates according to the amount of hard ore carried in the burden. One furnace which runs on half hard and half soft ore uses only  $\frac{1}{2}$  ton of limestone to the ton of iron.

### LABOR.

It will be readily appreciated from the data given in regard to the grade of the ores used, the quantity of coke required, that the labor item, so far as the handling in the stockhouse is concerned, is heavier, so far as day's labor is concerned, than at the majority of furnaces in other parts of the country. It is true that common labor is cheap, but, on the other hand, it is certainly not as effective, and what is an important consideration, is far less reliable. Until now common labor in the South has been strikingly migratory, which imposed additional burdens and trials upon furnace-men in a new district. Practically they have been forced to educate two or three times as many men as were really needed for a full crew, and the establishment of new works is likely to keep this feature prominent for at least some time to come. So far as skilled labor, engineers, machinists, mechanics, is concerned, the furnace companies must pay prices above the average, because the country itself does not furnish this class of men, who must be brought from the North with some special inducements. The unreliability of common labor is often a serious factor. Pay-day is only too often followed by practically a suspension of work for two or three days, and a passing circus has charms for the average colored miner or furnace hand which no threats or promises can overcome. The result naturally is that in spite of a low per diem rate for the common labor the cost per ton of iron is not less than \$1.75, and ranges up to \$2. Another very serious matter is the grading of Southern iron, the practically impossible test being imposed upon Southern managers of cutting up their product into

### TWELVE GRADES OF IRON.

The following formidable array of figures represents the make of one furnace in 10 days and in one month. It is just to add that this does not represent average work, because the furnace was stopped three days. It is simply given to show what an incubus upon the industry such a system of grading must naturally be:

Grade.	Ten days.	One month.
No. 1 foundry.....	384	384
No. 2 foundry.....	384	384
No. 3 foundry.....	384	384
No. 1 mill.....	384	384
No. 2 mill.....	384	384
No. 1 bright.....	384	384
No. 2 bright.....	384	384
No. 1 open silver gray.....	384	384
No. 2 close silver gray.....	384	384
Mottled.....	384	384
White.....	384	384

But not only is the furnace manager weighted down with the necessity of such a ponderous system of grading, but it is urged by those who have had experience elsewhere that the grading of Southern iron has started on an altogether false basis. It is claimed, although that claim is vigorously disputed by producers in rival sections, that in reality Southern No. 2 foundry is the equal of No. 1 in older districts; that the system of grading adopted was done in deference to the desires of middlemen, who held that they could more easily introduce the iron, in this way disguising concessions. However justifiable that course may have been, it is argued that Southern iron has now conquered its place in the markets and that a reform is urgently needed and can now be carried through. The characteristics of the Southern grades are explained by a Southern producer as follows:

No. 1 Foundry. This is a large, open-grained iron which is not often made, because the furnace is working too hot when it is being produced.

No. 2 Foundry. This it is insisted is really the equivalent of No. 1 foundry of the North.

No. 2½ Foundry. The equivalent of No. 2 foundry of the North.

No. 1 Bright. This is a light colored foundry iron, equal in grain to No. 1, except that it is lighter in color. It is made in the North, but is not separately graded there.

No. 2 Bright. Equivalent to No. 2 foundry of the North, except that it is lighter in color.

No. 1 Mill Iron. This is a good mill iron, which by some might be classed as a foundry pig. It is claimed to be the equivalent of the excellent Northern gray forge.

No. 2 Mill. This is the ordinary mill iron.

Gray Forge. This is a special grade, sometimes called for. It is a mixture of one-half No. 1 mill and one-half No. 2 mill iron.

1 C. An open silver gray iron.

2 C. A close silver gray iron.

Mottled and White. These have the usual characteristics.

This is the producer's side of the argument, and we are informed that efforts are now being made to bring about a reform in the direction of grading what is now No. 2 foundry as No. 1 foundry, and selling it as such. It would be of interest to the trade to learn the views of other sellers and of consumers on a question which is likely to be seriously agitated in the near future.

A telegram from Ishpeming, Mich., dated the 11th inst., says: "The contract for the building of ore docks at Marquette and St. Ignace has been let to Thomas H. Hamilton, of Toledo. Three docks at Marquette, having a capacity of 18,000 tons, will be increased to 33,000 tons. An additional dock at St. Ignace will hold 10,000 tons. It is the largest single contract of the kind ever let. The new docks will be built by the opening of navigation next spring."

At a meeting of the stockholders of the A. C. Barnes Whip Company, of Westfield, Mass., held on Wednesday, the 7th instant, a dividend of 8 per cent. was declared, and the following officers were re-elected: President, A. C. Barnes; vice-president, George Fierline; clerk and treasurer, H. M. Gowdy. The company expect to move into the large factory now building for them by February 1.

## Enterprise Reversible Float and Outlet Valve.

The Sandwich Enterprise Company, Sandwich, Ill., have recently put this valve on the market. It is represented in the accompanying illustrations, Fig. 1 showing its use as a float-valve and Fig. 2 as a tank outlet-valve. When used as a float-valve it will be observed that the valve opens outward with the direction of the flow, but is held closed at the proper time by the float acting on the long arm of the lever and causing the short arm to assume a nearly vertical position and

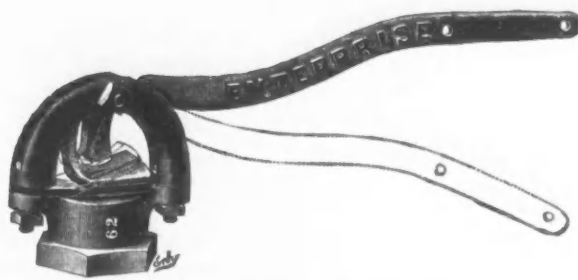


Fig. 1.—Reversible Float and Outlet Valve.

closing the valve. When closed the pressure, however great, instead of being borne by the float is resisted by the pivot bolt in the arch. The body of the valve is of brass threaded for pipe, and adapted to be screwed on with an ordinary wrench. The point is made that it will not rust fast to the pipe, as is often the case with iron valves, and that the valve seat being of brass and lathe faced makes a perfect joint and continues smooth with wear. The valve is described as made of the best quality of leather, and is held in place by the bolt securing one end of the arch to the body. The valve weight is made with reference to taking up loss by wear, and also has a horn which the weight of lever acts upon in opening, and allows free passage of water when under pressure. The lever is made of good length to insure easy and reliable working of the valve by small floats. It is explained that in case of pipes being placed in corners or at sides of tanks where there would not be sufficient room to revolve the lever, and after the valve has been screwed on the pipe, it can be replaced. Fig. 2 represents the valve used as a tank outlet-valve. When it is desired to use it in this way the lever is removed and replaced reversed, when the raising of the lever, as with a cord passing over a pulley on the edge of the tank, will close the valve, while releasing it will cause the weight of the lever to close and securely hold it shut. The



Fig. 2.—Tank Outlet Valve.

fact that this valve is reversible is a point which is emphasized, as it saves the dealer the necessity of keeping a double supply of tank and outlet valves, either being changeable into the other in a moment's time.

## The Improved Adjustable Queen Anne Screen.

The Queen Anne Screen Company, Burlington, Vt., for whom John H. Graham & Co., 113 Chambers street, New York, are sole agents, are putting on the market for the coming season a new screen, which is represented in the accompanying illustration. It is named the Adjustable Queen Anne Screen. From the cut it will be seen that it is made with a box panel, and the point is made that it can be adjusted without the friction noticeable in other adjustable screens. The fact that it is alike and equally well finished on both sides is emphasized by the manufacturers as making it to be a strictly double faced screen. This screen is made of soft or hard wood, and is stained imitation black walnut or cherry or finished in the natural wood, as desired.



Adjustable Queen Anne Screen.

Nos. 1, 2, 3, 4 and 5 are made of Pine and Bass Wood stained imitation of Black Walnut, with thimbles on one side. Nos. 10, 11, 12, 13 and 14 are made of Maple or Birch stained imitation of Black Walnut, finished in hard oil or shellac, with lifts and face plates. Nos. 20, 21, 22, 23 and 24 are made of Maple or Birch, stained imitation of

Cherry or in natural wood and cabinet finished, with lifts and face plates. The manufacturers place this screen on the market with confidence that it will meet the wants of the trade, and allude to it as a new departure in adjustable screens, and free from any objections found in others.

## The Leonard Milk Cooler.

The accompanying illustration represents a new device, manufactured by the Grand Rapids Refrigerator Company, of Grand



The Leonard Milk Cooler.

Rapids, Mich., which is intended to be used in connection with their upright refrigerators. It consists of a milk can, with a tight-fitting lid, all made of the best XXX bright tin, surrounded with a water tank made of galvanized iron. A glass window, 2 inches in diameter, is set in the front end of the tank, through which the milk can be seen. A nickel-plated faucet is attached to the under side of the can. The skim milk can

be drawn off by the faucet separately from the cream, which will flow last. The chief merit of this milk cooler is that whenever the supply of ice in the refrigerator runs low from any cause, or the refrigerator door

## Neely Hand-Forged Butcher Knives.

Richard G. Lewis, Chillicothe, Ohio, in connection with the line of corn cutters,



Neely Hand-Forged Butcher Knife.

formerly of South Salem, Ohio. The trade will appreciate the simplicity and utility of the supporter, which is the special feature of these knives.

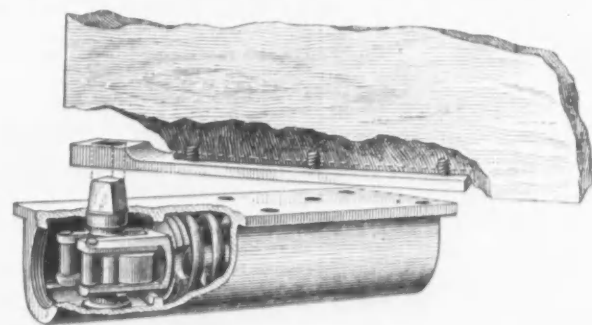
The shipping built on the lakes at and above Buffalo this year amounted to—neglecting smaller craft—5 steel and 1 composite steamer, with an aggregate net tonnage of 11,372 tons, valued at \$1,150,000; 43 wooden steamers aggregating 47,737 tons, valued at \$4,367,000, and 4 wooden sail vessels of 4623 tons, valued at \$300,000, or 53 vessels in all, valued at \$5,817,000. It will be noticed that the average value of the 5 steel steamers is \$101.50 per ton, while the wooden steamers are valued at only \$10 per ton less. The tonnage built in the same locality for the fiscal years 1884-85 and '86, as returned by the United States Commissioner of Navigation, was:

	1886.	1885.	1884.
Sail tons.....	4,890	3,669	7,380
Number.....	14	24	25
Steam tons.....	10,779	15,501	15,885
Number.....	14	24	25

Total tonnage..... 15,675 19,170 23,065  
The increase to 63,732 tons shown in the table records a remarkable development in

## Bardsley's Checking Spring Pivot or Hinge.

This article is put on the market by the Yale & Towne Mfg. Company, Stamford, Conn., and 62 Reade street, New York, who



Bardsley's Checking Spring Pivot or Hinge.

are the sole agents for its sale. The illustration is intended to represent this article as it is applied to the bottom of the door, there being another pivot on the top of the door, the door swinging on these pivots instead of hinges. The checking spring pivot or hinge shown in the illustration is let flush into the floor or will beneath the door, its object being to furnish at once the hinge on which the door moves and the mechanism by which the door shall be automatically closed. It has a heavy iron frame which is covered by a brass plate which is in sight and flush with the floor, projections on the door or frame being thus entirely avoided. The working parts are made of steel, and the casing which contains the mechanism is filled with a lubricating fluid, thus insuring

the appliances of transportation, which would be greater if all the craft constructed had been returned in the table. At the end of the fiscal year ending June 30, 1886, the steamers on the lakes were 1174 in number, with a tonnage of 372,961, of which 35 steamers of 40,460 tons were of iron or steel, and 1105 sailing vessels registering 262,657 tons, or 635,618 tons in all.

A fire in Chicago on Monday night swept off one half of an entire business block, including the large wholesale shoe factory of Phelps, Dodge & Palmer, whose loss is estimated at \$775,000, or something like \$160,000 above the insurance. The total loss is \$1,000,000.



## Special Notices.

## BUSINESS OPPORTUNITIES.

## TO MANUFACTURERS.

## THE NORTH ST. PAUL LAND COMPANY

OF ST. PAUL, MINN.,

are desirous of locating on their land twenty more large manufacturing establishments. There is no place in the United States better adapted for manufacturing some line of goods than St. Paul.

To any one wishing to engage in this business, we are prepared to offer liberal inducements in land and cash. Correspondence solicited. We mean business.

### The North St. Paul Land Company

St. Paul, Minn.

## ATTENTION,

Capitalist and Foundryman.

An Incorporated Company offers for sale State Rights to manufacture, and sell a valuable Patent Boiler (for house-heating). Hundreds in successful operation, which can be referred to for full particulars.

Address Box 1006,

WORCESTER, MASS.

New England States reserved.

## VALUABLE IRON MINE FOR SALE.

This property covers an area of 300 acres and exhibits at various points an Ore giving 66 per cent. of iron—furnace best—no sulphur or phosphorus. The property is situated within 10 miles of Ottawa and is most favorably placed for mining operations. The highest reports upon the property have been received from first-class experts. Title perfect. The new Canadian iron tariff makes this a most valuable property. Samples of the Ore and further particulars can be obtained by applying to the Manager—Ontario Bank Ottawa, Canada.

## FOR RENT.

## VALLEY FORGE MILL AND WATER-POWER

(Belonging to Estate of Charles H. Rogers, dec'd.) Situated at Valley Forge, Pa., on the Phila. and Reading Railroad, 23 miles from Phila. The buildings consist of a 7-story stone Mill, L shaped, with tin roof, 2 stone Tenant Houses and stone Dry and Dye House. The water-power is known as one of the best in the State. The property was occupied for many years as a Woolen and Cotton Manufactory, but is adapted to general manufacturing purposes.

J. B. CARTER, Hardware Manufg. Agent,  
304 Commerce St., Philadelphia.

## NOTICE

## TO HARDWARE MANUFACTURERS.

If you have any desirable specialties for which you would like to establish an Agency in Philadelphia, please address

J. B. CARTER,

Hardware Manufacturers' Agent,  
304 Commerce Street, Philadelphia, Pa.

## FINE OPENING FOR A FOUNDRYMAN.

In consequence of the death of the manager a fine Foundry and Machine Shop, doing a large business at Birmingham, Ala., is on the market.

Address BOX 603, Birmingham, Ala.

## TO HARDWARE MANUFACTURERS.

The agent for several foreign houses in the Hardware line, who has been visiting for the last fifteen years the Wholesale Hardware and Cutlery Trade of the United States and Canada and is personally well known to most of the buyers, would like to sell with his foreign some lines of American goods either on salary or commission. He has made arrangements to travel extensively, and has special facilities to place and keep a line of goods before the trade. Address "FOREIGN AND DOMESTIC," office of The Iron Age, 66 and 68 Duane Street, New York.

## FOR SALE.

## A Choice Manufacturing Site

near Pittsburgh, Pa., 25 to 35 acres, lying between and fronting on Monongahela River and Pittsburgh, Virginia and Charleston Railroad. The location is unsurpassed for a large manufacturing plant. The land is all level and above high water. Natural gas convenient, also sand, brick clay, sandstone and good building stone. Special inducements will be offered to any manufacturer locating thereon. For particulars address

HENRY A. WEAVER & Co. Real Estate Agents,  
94 Fourth Ave., Pittsburgh, Pa.

## FOR RENT OR LEASE.

Well-located brick buildings upon the P. R. R. system suitable for foundry or machine purposes, or can be adapted to any special manufacture. Connected with the railroad by tracks running into the yard. To a suitable party a lease will be made for a term of years upon favorable terms.

Address P. O. Box 1547,

Philadelphia, Pa.

## FOR SALE AT A BARGAIN.

Owing to the death of one of the firm, I offer for sale the following: A fully equipped FOUNDRY AND MACHINE SHOP, with new brick buildings in good running order; railroad in front, and good title given. For further information, address

W. M. AIKIN,  
Care of Aikin & Lighton,  
Birmingham, Ala.

## IN MINES FOR LEASE.

Proposals for the Lease of THE CASH Tin Mines and Property, of Rockbridge County, Virginia, will be received until the 1st day of January, 1888.

Address

J. K. EDMONDSON,  
Pres't of "The Virginia Tin Mine and Mfg. Co.,"  
at Lexington, Va.

## Special Notices.

## BUSINESS OPPORTUNITIES.

## FOR SALE.

## ROLLING MILL!

Will be sold publicly to the highest bidder, on the premises, the industrial plant known as

## SWIFT'S IRON AND STEEL WORKS,

Situated in the City of Newport, Ky., opposite the City of Cincinnati, Ohio, on the east bank of Licking River, within a thousand yards of the Ohio, comprising 8 acres of land, including the buildings, structures, machinery, fixtures, and appurtenances thereto belonging and in connection therewith.

The sale will be made on the premises, beginning at 10 o'clock a. m.,

On Saturday, December 17, 1887,

On a credit of 6, 12, 18, 24, and 30 months' equal payments—no cash down. The Master Commissioner of the Campbell Chancery Court will make the sale under a judgment of said Court, rendered on the 16th of September, 1887, in the action of Adam Wagner, Assignee of Swift's Iron and Steel Works, and John Trapp, against Swift's Iron and Steel Works and others, No. 3,321. There will also be sold at the same time and place on a credit of 6 months all the personal property belonging to the concern, including raw and manufactured material, coal, coke, horses, mules, &c.

The purchaser will be required to give bond for the purchase money, payable to the Master Commissioner, bearing 6 per cent. per annum interest from the day of sale, with approved security.

The mill is covered with an iron roof, and contains:

One 8-inch guide roll train, with fly-wheel center-shaft, plates and shears, with all the rolls, &c.

One 10-inch train, fly-wheel, plates, shears and all the rolls, &c.

One 18-inch bar train, with all the rolls, &c.

One fire-bed mill and shears, with two pairs 46-inch chills, and one pair 60-inch soft rolls.

One plate mill, with pinion, and three 62-inch chills, and two pairs 82-inch soft rolls.

Six-foot plate shears, with spare all steel knives, and small clipping shear for scrap.

One muck train, with three stands, housings, pinions and squeezer, underground shafting, two pairs of spare rolls.

One muck mill, two sets rolls and pinions, two pairs spare rolls and squeezer.

Sheet train, three stands, rolls and crane, with two sets spare rolls.

Nine boiling and one heating furnaces, with stack, boiler and connections and tools and fixtures.

Two sheet and two pairs heating furnaces. Annealing furnace, brick building.

One 36 x 36 piston-valve engine, fly-wheel, gear, doctor pumps, &c.

Eight 42-inch diameter double-flue boilers, 24 feet long, mud and steam drums, valves, &c.

Star mill engine, two band wheels, &c.

Seventeen boiling, two scrap, two slab, two annealing, one screw, one upright squeezer and one 8-inch mill heating furnaces.

Blast furnace, stack with hoist, casting house, five 40-inch diameter 60 feet long boilers, &c.

One new blowing engine, steam cylinder 36 x 48, blast cylinder 36 x 48, draft stack, &c.

Holding river crane, with foundation, two double engines, hoisting machinery, &c.

Twenty-four coke ovens.

Blacksmith and carpenter shops, scales, trucks, shears, shafting and every appliance ordinarily used in the operation of a rolling mill.

The mill is doing a prosperous business, and is running full time, with a good trade, and will be delivered to the purchaser in running order and running.

By a switch running to the yard the mill is connected with all the railroads entering into Cincinnati, in addition to the advantages and conveniences of the Ohio River.

For more specific information apply to

G. ARTSMAN, Master Commissioner,  
Campbell Chancery Court.

Newport, October 17, 1887.

## FOR SALE.

The Hoyle-Jones Manufacturing Company's plant fronting on the C. & E. R. R. and Ferry Landing, in Martin's Ferry, Ohio, opposite Wheeling, W. Va. The site consists of three lots 100 feet front and extending back 230 feet to C. & E. R. R. The building is brick, two stories high and with metal roof. It is L shaped, 81 feet front and 75 feet back; main building 38 feet deep and 1.50 feet wide. Also annex for smith shop 36 x 44 feet. Machinery consists of a new 40-horse power engine; also boiler and shafting for running the same, as follows: Two engine lathes, one screw cutter, one screw drill, one upright squeezer and one mill machine; blacksmith and other tools for iron work; also one 24-inch traverse wood planer, cross-cut and rip circular saws, boring and cornering machines, work benches and other small tools. Advantages of this property for manufacturing are not excelled, having the C. & E. R. R. and the Ohio River Railroad in front and the C. & P. R. R. in the rear. Goods loaded here go to any part of the United States without change of cars. Natural gas main passes in front of building; water on premises. For further particulars and terms apply to

E. J. HOYLE, { Martin's Ferry, O.  
J. B. MONTGOMERY, {  
Or JAMES P. SAYER Washington Pa

## Manufacturing Business for Sale.

A Manufacturing Business established over forty years, with a first-class reputation for goods manufactured, and now in successful operation, with a large amount of orders on hand. No establishment in the country has a better reputation for its product. Goods sold by all Hardware and House Furnishing establishments. Trade extends to nearly all the States. Equipped with water power, which is sufficient for eight months in the year, and steam power to use when water is low. Well located in Ohio. No labor troubles. Business can be quadrupled by putting in the necessary capital. The capital required is \$15,000, one-half of which time will be given. Reason for selling death of one of the owners. Parties meaning business address

"TRI-LEX"

Office of The Iron Age, 66 &amp; 68 Duane Street, N. Y.

FOR SALE.—The largest general stock of Hardware, Stoves, Iron, &c., in the city of Rockford, Ill. Established in 1854. Best location and doing the largest business in the city. Stock clean and first-class in every respect. Best of reasons for selling. Address

ALBERT W. COBB,

118 So. Main St., Rockford, Ill.

## FOUNDRY AND MACHINE WORKS.

Desirable Opening. An interest in a well-established business, doing a large trade in a neighboring city, will be disposed of on favorable terms. Apply to

GEORGE W. GIBBS &amp; CO.,

No. 33 Fremont Street, San Francisco, Cal.

A WELL-KNOWN MFG. CO., with specialties relating to the hardware trade and with agencies in New York and Chicago, wishes to increase its line with other goods selling to the same trade. Its long business relations with the export trade and the entire wholesale jobbing trade of the United States and the British Provinces offer superior advantages for placing articles of merit before the public. Address

"OLD MFG. CO.,"

Office of The Iron Age, 66-68 Duane Street, N. Y.

## FOR SALE.

A Valuable Mine of BESSEMER IRON ORE in Northern New Jersey; rich; easy of access and easily mined.

E. H. WRIGHT, Warwick, N. Y.

## Special Notices.

## BUSINESS OPPORTUNITIES.

## RECEIVER'S SALE, REMINGTON ARMORY.

In pursuance of an ORDER of the SUPREME COURT of the State of New York, the undersigned, as Receivers of the Property and Estate of the Corporation of E. REMINGTON & SONS, will sell at Public Auction to the highest bidder, subject to the approval of the Court, on the

First day of February, 1888,

on the premises, at Ilion, N. Y., commencing at 10 o'clock noon, the following property, lately of the said Corporation, namely:

All the Real Estate and the buildings thereon, comprising and constituting the Remington Manufactory of the said Corporation, together with the Water Power and Privileges, Water Wheels, Steam Engines, Boilers, Shafting, Gas and Steam Pipes, Fixed and Movable Machinery, Tools and Fixtures, Parts of Fire-Arms and Ammunition, of Sewing Machines and of Electric Light Apparatus, finished and in process of manufacture, Patterns Model or Sample Arms Letters Patent and Licenses thereunder and Office Furniture.

The Plant is adapted to and has been used for the Manufacture of Military and Sporting Arms and Ammunition, Sewing Machines and Cabinet Ware, and Electrical Light Apparatus, and other lines of Iron and Steel Goods, it being the works of the world-known Corporation, E. Remington & Sons; and being one of the most extensive and complete Manufactorys of the kind in the world.

The capacity is ample for the production of one thousand military fire-arms per day, besides sporting arms, ammunition, sewing machines, &c. It is one of the oldest established businesses in the Country, its products are favorably known all over the world, and it is the intention to dispose of it as an ENTIRETY with all its franchises and with the world-known Corporation, E. Remington & Sons; and the purchaser may continue the business without interruption.

The works are located at Ilion, in the central part of the State of New York, on the Erie canal, and on the line of the N. Y. Central and the West Shore Rail Roads.

For a descriptive catalogue and for further particulars, address

ALBERT N. RUSSELL,

and ADDISON BRILL,

Receivers, &amp;c., Ilion, N. Y.

## FOR SALE.

## HARDWARE STORE AND SANITARY

## PLUMBING BUSINESS

In a booming village of eight thousand; convenient to New York City; no other hardware dealer in the place. About four thousand required. Apply to

JOHN WALLACE,

100 Spring Street,

New York City.

IN CONSEQUENCE OF THE EXPIRATION OF PARTNERSHIP at an early date a first-class Hardware business is offered for sale in Rochester, N. Y., on favorable terms. This is a very good opportunity for any one desiring to engage in business, as this is well established, and in good running order, and the stock is clean and desirable. Full particulars will be given bona fide inquiries upon application to

POMEROY P. DICKINSON,

Rochester, N. Y.

## TO A CAPITALIST.

A practical and scientific Puddler, after twelve years study, has, by the aid of an entirely new principle in mechanics, invented what he considers a vast improvement in the manufacture of iron. He desires an interview with a capitalist with the object, should he be able to show the merits of his invention, of putting it into operation. The most particular investigation invited. Address "PITTSBURGH," office of The Iron Age, 66 and 68 Duane Street, New York.

## WANTED.—CHICAGO AGENCIES, by January

1st, for specialties in Builders' Hardware, 20 years experience; know every Chicago architect, and have done business with them for years; unexceptional references; want about three good lines on salary or commission. Address "EDGE WATER," office of The Iron Age, 66 and 68 Duane Street, Chicago, Ill.

## FOR SALE.

A well established and paying HARDWARE and FURNITURE BUSINESS, with Tin Shop and Coffins: Furniture Department can be disposed of if not wanted; stock and store building from \$12,000 to \$14,000; death of one member of firm reason for selling.

"HARDWARE,"

P. O. Box 23, Leesburg, Fla.

## BLAST FURNACE FOR SALE.

A modern Blast Furnace (Anthracite) well located and now in successful operation, will be sold and delivered in blast at a bargain. A good opportunity for a party wishing to enter the iron business in a moderate way. Address

Lock Box 1622, Philadelphia, Pa.

## FOR SALE.—A good clean stock of

HARDWARE, STOVES, IRON, ETC.

In a prosperous manufacturing town in Northern New York trade increasing every year; good reason for selling. Address "SPHINX," Office of The Iron Age, 66-68 Duane Street, N. Y.

## WANTED.

To Purchase one bird or one-half interest in a Hardware Business, by a young man with capital and experience. Have not advertised before. References A1. Communication confidential. Address

"HARDWARE,"

Office of The Iron Age, S. E. cor. Fourth and Main Streets, Cincinnati, Ohio.

## HARDWARE BUSINESS FOR SALE

In village of 2500 inhabitants in Western New York. Stock about \$8000. Best of reasons given for selling. For particulars address

W. M. AIKIN,

Bergen Gene-ee Co., New York.

## PRICE BOOKS.

LARGE SIZE, 500 Pages, 6 x 9 1/4 in. each, \$8.00.

POCKET SIZE, 250 Pages, 4 x 7 in., each, \$4.00.

Send for Circulars.

## B. LAMBERSON,

PORTLAND, OREGON.

EUGENE BISSELL, Auctioneer.

HAYDOCK &amp; BISSELL,

Successors to ROBERT R. HAYDOCK &amp; Co., and E. BISSELL &amp; Co. WHOLESALE.

## HARDWARE AUCTIONEERS.

12 Murray St. and 15 Park Place, N. Y. Sales held weekly for the trade. Consignments solicited. We refer to the leading manufacturers and importers.

## Special Notices.

## MACHINERY.

## BARGAINS IN SECOND-HAND AND NEW MACHINE TOOLS.

PLANERS.—Second hand.

120x20x4 New Haven. Good order.

125x20x5 Good order.

120x23x7 Thayer and Houghton. Good order.

PLANERS.—New.

120x20x4 Williams.

124x24x6 Pease.

130x30x8 Pease.

LATHES.—Second hand.

119x8 Lodge, Barker & Co. Good order.

120x8 8 in. field. Good order.

126x12 New Haven. Good order.

126x22 Fitchburg. Good order.

118x12 Plath. Good order.

LATHES.—New.

112x36 bet. Centers Sebastian, May & Co. Eng. Lathe.

114x40

117x8 Lodge, Davis & Co. Engine Lathe.

117x8 Muller Machine Tool Co. Engine Lathe.

1 each 19x20, 11, 13, Lodge Davis Engine Lathe.

1 each 21x20, 11, 13 Lodge Davis Engine Lathe.

1 each 13, 16, 19 Lodge Davis Turret Lathes.

1 Star Plain Hand Lathe.

14x20 V. E. Reed Engine Lathe.

121x12 Dustin Mfg. Co. Engine Lathe.

124x12 Perkins Engine Lathe.

127x12 Lodge, Barker & Co. Engine Lathe.

DRILLS.—Second hand.

1 each 20x24 Bickford Drills. Good order.

120 inch S. F. Drill. Good order.

14 spindle Drill. Good order.

DRILLS.—New.

326-inch Lodge, Davis & Co. No back gears.

1 each 20, 24, 30 and 38 L. D. & Co. Upright B. G. S. F. Drills.

18 inch Lever Feed Drills.

Foot Drills, all sizes.

MISCELLANEOUS

1 Sellar's Car-Wheel Borer. Second-hand. Good order.

117-inch Durkee shaper. Second-hand. Good order.

120-inch Shaper. Second-hand. Good order.

1 Slab Miller. Second-hand. Good order.

1 600-lb. Drop Hammer. Second-hand. Good order.

1 Broom Handle Lathe. Second-hand. Good order.

1 each Wells Bros. and National Bolt Cutters. New.

1 Pulley Balancing Machine. New.

1 Foot-power Hammer. New.

1 each 8-10-in. soybean & Plumer's Shapers. New.

1 each 15 and 20 inch Friction Shapers. New.

1 each large and small Davis Keyseaters. New.

1 Fox Wood Trimmer. & Co. Engine Lathe.

Grinding Machines, all sizes, Diamond Machine Co. New.

Write for Prices. It will pay you.

## LODGE, DAVIS &amp; CO.,

Cincinnati, O.

Manufacturers of Engine Lathes, Shapers, Drills, &amp;c. Dealers in Iron and Brass Working Machinery.

## Large Lathes in Stock.

1 42 in. x 18 ft., triple geared.

1 32 in. x 18 ft., triple geared.

1 32 in. x 20 ft., second-hand, in good order.



### Special Notices

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THE NEWEST BOOKS

**Locomotive - Engine Running and Management.** A Practical Treatise on the Locomotive Engines, showing their performance in running different kinds of trains with economy and dispatch. Also directions regarding the care, management and repairs of Locomotives and all their connections. Illustrated by numerous engravings. 8th edition. By ANGUS SINCLAIR, M.E., \$2.00.

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development, and construction of Submarine Boats.  
With two folding plates. G. W. HOUGAARD. \$2.75

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Runners, Owners and Makers of Pumps of any kind, covering the theory and practice of Designing, Constructing, Erecting, Connecting and Adjusting. By R. GRIMSHAW.....\$1.00

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Electrolysis according to original methods; authorized translation from the German of Dr. Alex. Classen. By PROF. WM. HALE HERVICK,....\$2.50

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*Any book published sent post-paid  
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**DAVID WILLIAMS.**

66 and 68 Duane St., New York.

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Notice is hereby given that the business heretofore carried on by the BAGNALL AND LOUD

**BLOCK COMPANY, of Boston, Massachusetts, and the PENFIELD BLOCK COMPANY, of Lockport, New York, will on and after this date be carried on by the**

**BOSTON AND LOCKPORT BLOCK COMPANY.**

a corporation which has succeeded to the business and properties of the undersigned. All demands against the Bagnall and Loud Block Company or the Penfield Block Company will be paid by their respective treasurer. All com-

communications and orders for the BOSTON AND LOCKPORT BLOCK COMPANY should be addressed to its offices at Boston, Massachusetts or to Lockport, New York.

**BAGNALL & LOUD BLOCK COMPANY.**

by HERBERT LOUD, Treasurer.  
PENFIELD BLOCK COMPANY,  
29th Nov., 1887. By MYRON H. TARBOX, Treasurer.  
EXCELLENT BLACK COPIES of anything written or

FACSIMILE, BLACK COPIES or anything written or  
 drawn with any Pen (or Type Writer) by the Patent  
**AUTOCOPYIST** Only equaled by  
 Lithography.  
 Specimens free.  
 AUTOCOPYIST CO., 166 William St., New York.

**SITUATIONS WANTED.**

*Undisplayed Advertisements for Situations*

**BY A PRACTICAL MAN,** a situation as **FOREMAN MOLDER** in an Iron Foundry; have had a large experience as such in the making of

had a large experience as such in the making of all kinds of machinery castings, and understand all the branches of the business thoroughly, and am fully competent to take charge of an iron foundry of any size or any class of work, and run it to a profit. Best of references. Address "CAR-

**A** YOUNG MAN twenty-two years of age desires a situation as book-keeper or assistant. Has had five years experience in the office of a

hardware commission house. For reference can refer to his employers and other responsible persons. "X. L. N. T.," office of *The Iron Age*, 66 and 68 Duane St., New York.

WANTED HARDWARE SPECIALTIES to sell to the trade in Michigan; prefer to sell on commission; have had twenty years' experience in the Hardware business; have traveled extensively in the State during the past three years, undoubted references can be furnished. K. F.

**BY JAN.** Ist a position to take charge of shop making light har. ware by a thoroughly competent man. Address "HEEREN," Office of The

**A** YOUNG MAN OF GOOD ADDRESS, careful and energetic, has a good practical knowledge of general hardware, well recommended, with good references, wants a situation in hard-

ware store. Address JOHN A. SELLS, 418 Fargo Avenue, Buffalo, N. Y.

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**A THOROUGHLY COMPETENT BLAST FURNACE MANAGER** is open for engagement; can furnish the best of recommendations as to

**A GENTLEMAN** with good scientific training

**FOR COMING SEASON**, by traveler of eight

years experience, line of good selling HARBORWARE SPECIALTIES for Indiana and Ohio. Address "KYRIL," Office of *The Iron Age*, 66-68 Duane Street, New York.

**A** in the management of rolling mills and machine shop; best references furnished. Address "M. M." Office of *The Iron Age*, 66-68 Duane Street, New York.

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**A POSITION AS ROLLING MILL MANAGER**

**A** or general manager of sheet, plate or bar iron works. Salary one-half what I have over any previous management. Experience East and West. Address "SHEET IRON," Office of *The Iron Age*, 77 4th Ave., Pittsburgh, Pa.

**B**Y A YOUNG MAN, who has had seven years' experience and has a good trade, a situation as TRAVELING SALESMAN in North and South Carolina for some good Hardware House. *Peters* to work the Retail Hardware Trade for Manu-

to work the best machinery, tools and fixtures or Manufacturers' Agents. Best references. Address "MINDEN," office of *The Iron Age*, 66 and 68 Duane Street, New York.

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**BY A PRACTICAL MECHANIC** of twenty-seven

15 years' experience as machinist, engineer, Foreman and Superintendent of several branches; steam a specialty; used to charge of men and

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## Special Notices.

shops; would take charge of steam plant, engines and machinery. Address D. H. BALDWIN, Mechanical Engineer, Gouverneur, N. Y.

**AS ROLLING MILL MANAGER**, by one who is not afraid of work, has 20 years' experience from the building to the management, understands the manipulation of men, thorough, also building and working of open-hearth furnaces. Is an Engineer and Machinist by trade. Address "H. D.," Lock Box 1086, Philadelphia.

**A POSITION AS SUPERINTENDENT OF HARDWARE FACTORY** by a thoroughly practical man in every department; thorough in keeping costs and understands the management of men. Refer to present employer. Address "D. A. T.," Office of The Iron Age, 66 and 68 Duane Street, New York.

**I WANT A POSITION** January 1st as TRAVELER or in a store, have had fifteen years' experience in the Hardware and Iron and Steel Trade, as buyer and salesman; Good reference. Address "HARDWARE," P. O. Box 450, Waterbury, Conn.

**A GENTLEMAN OF LARGE EXPERIENCE** in business desires position as Corresponding Secretary to a corporation or firm where a thorough knowledge of mercantile and manufacturing interests of the country will be available. Address "E. MILLER," 342 Nassau Ave., Brooklyn, N. Y.

**A MAN HAVING EXTENDED** and intimate acquaintance with leading Hardware trade in Eastern and Middle States is open for arrangement with manufacturing party as Salesman. First class testimonials furnished. Address "NASH," 118 Chambers St., New York.

**COMMERCIAL TRAVELER** of well known ability, acquainted with the mechanical lines and engine specialties, is open for engagement January 1st; A I references if required. Address "COMMERCIAL," Office of The Iron Age, 66 and 68 Duane St., New York.

**A GENTLEMAN WITH TEN YEARS' EXPERIENCE** on the road and a thorough knowledge of the Hardware business desires an engagement January 1st; would not object to Western house; unquestionable references. "MERCANTILE," Office of The Iron Age, 66 and 68 Duane St., New York.

**A GENTLEMAN with a thorough knowledge** of the WHOLESALE HARDWARE BUSINESS in all its details will be open to an engagement Jan. 1st. Address "E. L.," Office of The Iron Age, 66-68 Duane Street, N. Y.

**BY A MAN OF EXPERIENCE** as SUPERINTENDENT or Foreman of Iron Foundry; references given. Address "P. O. Box 783," Providence, R. I.

**AN ACTIVE AND PUSHING MIDDLE-AGED GENTLEMAN** of extensive business experience and acquaintance, would like to make arrangements with some first-class manufacturer as resident manager of their business at Chicago. Best of references and any bond that may be required. Address "MANAGER," care Kelley, Maus & Co., Chicago, Ill.

**COMPETENT BOOKKEEPER AND EXPERT STENOGRAPHER** would like a position after January 1st; ten years' experience; best of references; now holds good position with prominent New England manufacturer, but finds it necessary to leave for healthier locality on family's account. Address "W. A. H.," Office of The Iron Age, 66-68 Duane Street, New York.

**A GENTLEMAN OF LONG EXPERIENCE** IN THE HARDWARE TRADE and Road, desires to secure a few lines to sell in Ohio, Michigan and Indiana to the Hardware Trade and Manufacturers, on salary or commission. Good references. Will be at liberty after January 1, 1888. Address "CRADOT," Office of The Iron Age, 66 and 68 Duane Street, New York.

**I WANT A POSITION**, January 1, as TRAVELER for a first class manufacturer, of special, general or builders' hardware; 12 years' experience on the road; acquainted with jobbing and large retail trade in 20 states. Only those desiring exclusive services of a good salesman at remunerative salary need answer. Unquestionable references. Address "HARDWARE," P. O. Box 5244, Marysville, Ohio.

**A BESSEMER MAN** of twenty years' experience, the last ten as Superintendent, which position he now holds, desires a similar position. Understands fully making and manipulating all grades of steel, from 10 to 80 carbon. Can handle men closely and effectively and accustomed to plan and direct construction. Address "BESSEMER MAN," Office of The Iron Age, 66-68 Duane Street, New York.

**A GENTLEMAN** who has had an extensive business experience and who possesses business abilities of a high order, would like to make an arrangement to take charge of a Chicago Agency for some first-class Eastern manufacturing firm. Best of references, both East and West. Address "H.," Office of The Iron Age, 66 and 68 Duane Street, New York.

## HELP WANTED.

Undisplaced Advertisements for Help Wanted not exceeding fifty words One Dollar each insertion. Additional words two cents each.

**TRAVELING SALESMAN**.—Energetic and pushing Salesman acquainted with Mill and Factory Supplies to sell goods in South and West for Western house. Must be experienced in selling goods on the road. State salary expected, with references. Address "W. & G.," Office of The Iron Age, 66 and 68 Duane St., New York.

**BLAST FURNACE FOUNDER AND ASSISTANT SUPERINTENDENT**. One preferred who has had actual experience in charge, and understands fire brick stoves, boilers and machinery. State age, experience, references, etc. Address "FURNACE FOUNDER," Office of The Iron Age, 66 and 68 Duane Street, New York.

**A YOUNG TRAVELING MAN** to make sales for a Pittsburgh iron firm in Baltimore, Philadelphia, New York City and the East generally. Must be one of experience, large acquaintance and come well recommended. Address "TRAVELER," Office of The Iron Age, 77 4th Avenue, Pittsburgh, Pa.

**FOUNDRY FOREMAN WANTED**: one thoroughly acquainted with Machinery and Water Works Castings, especially Water Pipe. The right man will secure an unusually good position. Address "J. S.," Box 44, Office of The Iron Age, 66 and 68 Duane St., N. Y.

**FOREMAN FOR A FOUNDRY JOB SHOP** About 40 moulders employed. Address, stating age, references and salary expected "FOUNDRY," Box 3143, Boston, Mass.

**A BOOKKEEPER** in a hardware store located in the central part of New York State; one familiar with the hardware trade preferred; must understand double entry. Address "UNLAD," Office of The Iron Age, 66 and 68 Duane Street, New York.

**SALESMAN WANTED**.—A salesman experienced in heavy and builders' hardware to travel in the Northwest for a Chicago house. Address in confidence, stating experience and salary wanted. "MERCHANT," Office of The Iron Age, 35 and 37 Washington St., Chicago, Ill.

**TRAVELING SALESMAN WANTED**.—COMPETENT, ENERGETIC AND PUSHING SALESMEN to sell a line of special goods well known to the Hardware, Store and House-Furnishing Trade; must be familiar with the Hardware Business, and experienced in selling goods on the road, and furnish first-class references. Other lines not conflicting can be taken. Liberal commission. Address "Box 141," Manchester, N. H.

**TRAVELER TO SELL TABLE AND POCKET CUTLERY** to the retail trade in the Eastern States on commission; also one each for New York State, Pennsylvania, Ohio, Indiana and Michigan; only those need answer who have an established trade and who wish to add above goods to their line. Address "CUTLERY," Box 272, Office of The Iron Age, 66 and 68 Duane St., New York.

## THE WEEK.

The Hudson River and the great lakes, excepting perhaps the channel between Lake Superior and Lake Huron, are still open and easily navigable, with several steamers yet in commission. It is seldom that such a state of affairs exists so late in December.

Mexico having settled with the English bondholders, now wants to contract a Government loan of \$50,000,000. It is believed that this is the beginning of the development of a scheme to fund the existing national debt in such a manner as will reduce the burdens of government, and that behind it is a group of English and French bankers, who regard the loan as entirely feasible.

Washington reports say that many members of Congress have under consideration amendments to the Interstate Commerce law. Senators Cullom and Reagan were greatly pleased by the report of the commissioners, and these advocates of the original act claim that the report will have influence enough to defeat any attack upon the main features of the law. Senator Cullom desires amendments in the interest of domestic roads which have Canadian competition. The railroads appear to be less urgent than others in asking for changes.

Twenty-inch guns behind steel plates backed with granite were recommended by Lieutenant Weaver, of the Second Artillery, in a paper read before the Military Service Institution, Governor's Island, on the outside line of coast defenses. The 16-inch guns contemplated by the Board of Fortification would, he said, be inadequate against modern ships of war. We must be able to stop hostile vessels beyond the range of their guns. The first point in the defense of New York is the barring of Long Island Sound. Besides, New York must keep the enemy's fleet out of the lower bay, which can easily be done if Congress will give us heavy guns. General Schofield spoke in approval of the paper.

A large oil firm in Pittsburgh are preparing a case against the Pennsylvania Railroad Company to recover damages for alleged freight discrimination in favor of rival manufacturers. The suit is brought under the act of the General Assembly of 1883, which allows three times the amount of damages sustained from unjust discrimination by railroad companies. In the case now presented the claim amounts to \$124,000 and interest for four years.

A number of business men from Kansas are visiting some of the chief cities in Mexico in hopes of building up a large direct trade between those points and the Northwest.

Advices from St. Petersburg speak of the probability that the import duties on rolled iron will be still further increased.

Dwelling houses numbering about 250 and costing \$1,000,000 have been erected in Bethlehem, Pa., within a year, mainly the result of Government contracts for steel and consequent enlargement of the works.

All competition in express rates between New York and Philadelphia has ceased—the business being now wholly controlled by the Adams Express Company, who have a contract with the Reading Company, recognizing them as the only local shippers of freight. Last November, the United States Express Company bought out the Baltimore and Ohio Express Company, and at once entered into competition for the large through business with the South, West and Northwest. The Reading now gives notice that it will receive no more express matter for New York, alleging breach of faith by invading the territory of its rival, whom it was compelled to protect. When asked how the Company as a common carrier could refuse to receive freight, President Platt, of the United States Express Company, replied, as the story goes, that "we are on friendly terms with the Reading and stopped when requested to do so."

The general managers of the lines between Chicago and the Missouri River, formally adopted the report of the general freight agents arranging for a reduction of freight rates in Illinois, Iowa and Missouri, and of through rates from Chicago to the Missouri River. The reductions are on all classes of freight, and will average fully 25 per cent. below the present tariffs in force. It was agreed that the new rates should go into effect January 1, if the Wabash could be persuaded to postpone action until that date, if not then, on December 20. The reductions, it is said, mean a slicing off of \$10,000,000 per annum in net revenues.

At a meeting of rubber manufacturers in this city, last week, an organization was perfected of what will be known as the Boston Rubber Boot and Shoe Trust. It is stated by those interested that the effect of the trust will not be to the disadvantage of the consumers. Though rubber shoes and boots may, in consequence of the organization, be advanced in price, the quality will be improved by the cessation of competition. The latter have put prices down so low that the companies have been forced to lower the standard of quality.

The Hotel Brighton, at Coney Island, a huge structure, having been partially undermined by the encroaching waters of the Atlantic Ocean, the owners have decided to move the building 600 feet inland, and the work has already commenced. To accomplish this a novel plan has been adopted.

The building will first be cut up, lengthwise, into three sections. A triple-track elevated railroad will be built under each section, flat cars will be run in, and a dozen or more engines, coupled in tandem, will convey the building to the desired spot. The magnitude of the undertaking can be fully realized when it is stated that the hotel has a frontage of 460 feet and an average depth of 150 feet. It is three stories high and is surmounted by five towers. Its weight is estimated as being 5000 tons. The bathing pavilion, which is 475 feet long by 75 deep, is to be moved in the same manner as the hotel.

The debt of the Argentine Republic is now said to equal about 40 per cent. of the total value of the Republic, but a leading Buenos Ayres paper says "it is no more than the country can bear."

The Grievance Committee of the Brotherhood of Locomotive Engineers for the Gould Southwest system met in St. Louis last week, with representatives from every division embraced in the Missouri Pacific Southwest system, and reported that they had no grievance against anybody; everything was working in a harmonious and satisfactory manner.

Merchants in San Francisco are speculating upon the effects which new railroad lines building in all districts on the Pacific coast will have upon trade at that center. To the south of that port Los Angeles and San Diego are growing apace, and on the north is Portland, from whence the California and Oregon Railroad now extends as far as the city of Mexico, and other lines are planned in the San Joaquin Valley, upon which important centers will be developed. Fresno is already coming into prominence. The San Francisco Journal of Commerce remarks upon this showing: "These roads open up a large extent of wheat, fruit, citrus and olive lands; there will be a great settlement of people all along the lines of road, and in the course of a couple of years a great addition made to the wheat, fruit, grape and other crops of California and Oregon. We will also have to reckon with the beet crop of the future, as it is about to enter largely into our agricultural products. The day for great profits is past for San Francisco. Her merchants and manufacturers must aim to benefit rather by the extent of the trade and the magnitude of their operations than by merely large profits on any particular article."

Virginia responds to the President's message by passing a resolution in the House of Delegates, with only one dissenting voice, directing Virginia's Senators and requesting her Representatives in Congress to secure the repeal at an early day of the entire internal revenue system of taxation, and, failing in that, to secure, if possible, the repeal of so much of the system as imposes a tax on tobacco in any of its forms and upon spirits distilled from fruits.

The New York Aqueduct Commissioners opened bids for the construction of the new dam at Sodam, in Westchester County. The lowest was that of Sullivan, Rider & Dougherty, who bid \$366,990.

The four-track system of railroads first introduced in this country by the New York Central Railroad Company is increasing. The Pennsylvania Railroad, which is throughout double tracked, has two additional tracks nearly completed between Philadelphia and Jersey City. Portions of the new track are in use, and in a few months the entire line will be in operation. It also has several miles of four-track line out from Philadelphia and from Pittsburgh and on other portions of the main line. The New York, New Haven and Hartford Railroad has in use 13 miles of road four-tracked from the Grand Central Depot to New Rochelle Junction. The 10 miles of road the railroad company are four-tracking and the 13 miles in use make 23 miles out of 73 miles from New York and New Haven four-tracked, and the remaining 50 miles will be provided for as soon as the present work is finished.

At no time since the introduction of natural gas in Pittsburgh has there been such activity in the iron works as at present, and the quantity of finished work turned out is said to be beyond precedent.

A French iron steamer is loading at Philadelphia with 750,000 gallons of petroleum in bulk for Calais, and the owners are expected to build a fleet expressly for the trade.

To supply adequately the increasing demands for water in Newark, N. J., for manufacturing purposes, the mayor recommends that works should be built without delay to bring water from the Pequonnock River. The estimated cost is \$3,000,000. Other municipalities are expected to join in sharing the expense and the advantages, as Jersey City is equally in need.

The water works authorities of Cleveland, Ohio, have ordered plans and specifications for the new lake tunnel for the supply of that city with fresh water. The new tunnel will be 7 feet in diameter, and about 1 1/4 miles long, lying an average depth of 70 feet below the surface of the lake, or about 30 feet below the bottom. It will cost \$300,000 and be finished in two years.

Large quantities of Southern hard woods are crowding their way into Northern markets. Yellow pine is being shipped more largely every year, and cypress and sap are

coming into more general use. It has been estimated that between 200 and 300 sawmills will be erected within the next six months in the Southern States. Pine land is being bought up both North and South, until it is difficult now to find a large tract within an easy distance of a market.

A large part of this year's fruit yield in California was lost through inability to hire laborers to gather it. The dependence heretofore has been Chinese labor, now driven from the State.

The steamer under contract by the Newburg Iron Steamship Building Company, for Capt. Geo. B. Hussey, to be employed in the New York and West India business, will register 3000 tons and be the largest ever constructed on the Hudson River.

Improvements taking place in Santo Domingo promise to make a tropical paradise in that island, if we may believe the glowing accounts given by Señor Carlos Julian, the newly appointed consul to New York. The new era of prosperity is attributed to the influence of President Heureaux, under whose enlightened administration numerous public works are being pushed with vigor. The railroad being built by the English corporation, at the head of which is Alexander Baird, is progressing rapidly. It is Santo Domingo's first railroad, and in a comparatively short time it will have become an easy journey from Santiago, the largest city in the interior, to Samana, on the eastern coast. The Government last autumn granted to Mr. Baird the concession to carry the road to Santiago and gave him 7 per cent. of all the import duties received at the port of Sanchez, the immediate seaport terminus of the road, for the term of 35 years, to begin on July 1, 1888. Another concession, from which much is expected, is for a shore line of railway along the southern coast, granted to New York capitalists. The line of track will be begun at Santo Domingo City and will pass through San Cristobal and extend through to Azua and other coast towns. Sugar growers, the majority of whom are located in that immediate vicinity, are expected to realize special advantages. A cable connection via Porto Rico is in contemplation.

The cotton receipts at New Orleans are nearly 200,000 bales more than last year, and the proportion is 29.15 per cent. of the total tidewater receipts at all the ports. Unlike previous years, the receipts were almost wholly by rail.

Work on the new water works in Chicago has been started. A shaft 90 feet deep is being sunk. After this has been completed three tunnels branching off from it are to be built. One to the east will be 4 miles in length, with a diameter of 10 feet, and will extend to the inlet crib built in the lake almost out of sight of the land. The second tunnel will run in a southerly direction to the pumping wells at the foot of Fourteenth street, while the third will run directly west 1 1/2 miles and will connect with the West Side water works, and through these with the North Side works. Over 10,000,000 bricks will be used in the construction of the walls of the tunnels.

The State of Michigan is out of debt, with \$875,000 in the treasury, and 62 banking associations, doing business under the general laws of the State, are reported to be in a sound and healthful condition.

The new reservoir of the National Water Works, in Kansas City, is sinking into the quicksand beneath, with a probability that the result of five years' labor and an expenditure of \$1,500,000 will eventually drop out of sight. It occupies an old channel of the Missouri River.

Cornelius Vanderbilt has purchased from the Astors 600 lots near Sherman Avenue and 153d street for about \$750,000, with the supposed object of providing terminal facilities for the New York Central Railroad.

Maine is becoming a great canning State. Eighty canning factories have, during the past year, put up over 14,000,000 cans of sweet corn, besides large quantities of apples, beans, tomatoes and other vegetables and fruit.

By the accidental blowing out of an automatic sprinkler head on the premises of the John Morris Stationery Company, at Chicago, a loss by water of some \$2500 has been caused, and a similar mishap in the Pillsbury Mills, at Minneapolis, has done \$1000 damage. The question in these cases is whether fire or water was most dangerous.

Application was recently made to the Treasury Department, at Washington, for an allowance of drawback on tin plate scraps resulting from the manufacture of imported plate into various articles. It was represented that such an allowance would promote the manufacture of articles for which tin plate is used as material, and that it would be without danger to the revenue, as no domestic tin plate enters into such manufacture. Assistant-Secretary Maynard denied the application, for the reason that it was not authorized by law.

Two propellers on the lakes last season sailed each 40,000 miles, and transported one 75,000 and the other 85,000 tons of freight, without the loss of a single day for repairs.

Andrew Carnegie, in an address before the Century Club, of this city, gave a rosate view of the condition of the United States in every point of view. He had no fear of

excessive immigration, of the exotic called socialism, or of pauperism. Of the latter he said there was no such thing, except what springs from bad habits or disease. There is no danger in "congested wealth," or even from "surplus money."

The New York Board of Street Opening, of which Mayor Hewitt is chairman, is discussing the difficult question how to relieve Broadway. In course of their investigations the Society of Civil Engineers and the Society of Mechanical Engineers were asked for their views respecting the widening of Elm street as a means of diverting traffic from that thoroughfare. The society first named report that William street near Frankfort and Elm near Worth could be advantageously connected by an intermediate tunnel, the elevation at one point being 34 feet above tide-water. The other society report in favor of widening Nassau and William streets as best calculated to relieve Broadway below Chambers, where the chief impediment to travel exist. It was shown that a proposed new avenue from Ninth street to Maiden Lane might cost as high as \$15,000,000, whereupon Mayor Hewitt expressed himself as in favor of deferring action until next year.

William Mulligan, one of the old iron manufacturers of this country, died suddenly at the Buckingham Hotel, on Sunday, in the 62d year of his age. He was born in New Brunswick, N. J., and was brought up in the iron business. While a young man he became a member of the iron firm of Fuller, Low & Co., of Dover, N. J., and later engaged in business in St. Louis. Twenty-two years ago he went to Saugerties, N. Y., and became a partner in the Ulster Iron Works Company, known as Tuckerman, Mulligan & Co. Two years ago Mr. Mulligan retired from active business, but kept up an interest in the trade with his brother, Cadwalader, R., in Dover, N. J.

The Continental Life Insurance Company, of Connecticut, with liabilities exceeding \$2,000,000 and assets of doubtful value, has gone into the hands of a receiver, and the officers are either fugitives or are under arrest. The number of policies in force was 7544. A serious diversion of assets is hinted at.

The Newark City Silk Mill is being removed from New Jersey to Bethlehem, Pa., on account of frequent labor troubles in the old location.

Harper, the Fidelity Bank wrecker, was found guilty in the court at Cincinnati and was sentenced to 10 years' imprisonment in the penitentiary. A motion for a stay of execution was overruled and the prisoner was taken to Columbus at once.

The French Government, it is announced, will no longer permit the French Cable Company to remain in the cable pool.

The east-bound transcontinental rates were announced last week. Quite as interesting will be found the west bound tariff, which is set forth in the table below for the principal classes. The Canadian Pacific differentials are also shown, as applying on New York freight. They are one-third less on Chicago business. The advance over the old transcontinental rates will average about 25 per cent.:

Class.	New York Rate.	Canadian Rate.	Chicago Rate.
First.....	\$4.00	30	\$3.25
Second.....	3.20	25	2.55
Third.....	2.50	20	2.00
Fourth.....	2.20	15	1.75
Fifth.....	1.80	12	1.44
Sixth.....	1.60	10	1.25

President Cleveland's nominations include these Envoys Extraordinary and Ministers Plenipotentiary: Oscar S. Straus, of New York, to Turkey; Alexander R. Lawton, of Georgia, to Austria-Hungary; Bayless W. Hanna, of Indiana, to the Argentine Republic.

The Industrial Education Commission of Pennsylvania organized in Harrisburg last week, electing Dr. Atherton president, and a number of questions pertinent to the subject were referred to the different members for investigation. The commission will also inquire how far the educational element should be incorporated into such training as distinguished from its strictly trade, apprentice or technical element.

The Philadelphia Manufacturers' Club are about to erect a handsome building on Walnut street, to be constructed of Indiana limestone. Balconies will overlook the street, and the roof will form a garden.

The New York Commissioner of Public Works, in response to a committee of the Chamber of Commerce appointed to consider the subject, reports that \$2,000,000 will be required to put the down-town thoroughfares in prime order.

Attorney-General Longley, of Nova Scotia, says the Canadian people want intimate trade relations with the United States. They disavow all sentiments of hostility, and recognize an identity of interests. Of more significance, because it is the first official utterance of a cabinet minister, is the speech of Sir Adolphe Caron, of Ottawa, who affirmed that if commercial union means anything it means annexation to the United States.

An interesting view of the commercial conditions existing in New Zealand is afforded in a Blue Book just issued. According to the last census the population numbered 578,482 persons, showing an increase of nearly 90,000, or at the rate of 18.07 per cent., upon the number in 1881. The island is destined to be a great agricultural country. All kinds of industries are prospering.



## MECHANICAL.

## New Press and Slotting Machine.

The Newark Machine Tool Works, of East Newark, N. J., have recently put on the market a number of new machine tools, among them the double pitman press and the slotting machine of which we present engravings on this page.

The press was designed for doing moderately heavy work at low cost and is well adapted for bending, crimping, shearing and punching sheet metal as thick as No. 18, for punching leather, paper, cloth and fabrics of all kinds. It takes 24 inches between the standards, but for working tin or other metal it can be widened to take 30 inches.

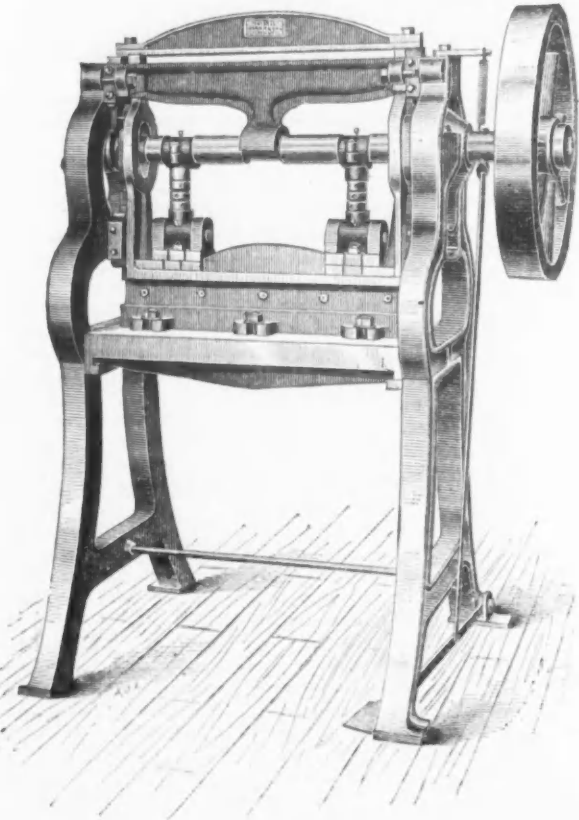


Fig. 1.—Double Pitman Press.

quired per car for additional cars is about as the above figures show—viz., 2 horse-power each.

## A Lilliputian Locomotive.

A very small locomotive has lately left the shops of Krauss & Co., of Munich. This engine, together with a car and 1 mile of portable track, is intended as a present from the King of Belgium to the Sultan of Morocco. This imperial toy will be laid in the gardens of the palace. The different pieces having necessarily to be carried from the port of landing to the capital by the primitive mode of freight transportation—the pack saddle—lightness of the single pieces was the chief consideration with the builders. The gauge is 23 3/4 inches. The heaviest parts of the

these are also fastened supplementary cutter-heads J, whose cutters are of such width as to project slightly below the level of the sprocket-wheel E.

The opposite end of the bar C is cut out so as to leave a space, spanned by a block, C', secured in position by bolts, and having a

the devices for effecting the forward feed and the return. The feeding mechanism being connected to and operated from the same shaft as the cutting mechanism, the rate of forward motion of the cutter will be proportionate to its rate of revolution. While the forward movement of the cutting

it and at the same time moving forward with the cutting mechanism. A rope, x, fastened to the drum S' passes forward to the plate A, around a pulley attached to it, and back to a pin, C', upon the block C'. A similar rope, x', is wound upon the drum S in the reverse direction, and thence passes forward to the head C, to which it is fastened.

The operation is as follows: Motion being communicated to the shaft J the sprocket-wheel E' is caused to turn and its motion communicated to the sprocket E, thereby operating the main cutter-head D and the small supplemental cutters J, the former cutting the main channel and the latter widening it and permitting the entrance of the driving chain K. It may be observed that the latter operates to clear away and carry off the coal as it is cut away. As the shaft J revolves it turns the worm-wheel U, the shaft R and the longitudinal shaft, carrying one of the bevel wheels, and the clutch T, being moved over into contact with drum S', the latter winds up the rope x and causes the cutting mechanism to move gradually forward. When the cutting mechanism has reached the limit of its movement the clutch T is moved over to the opposite side, and the drum S' being now loose on its shaft, the rope x' is wound up upon the larger drum S and the cutting mechanism drawn back to its original position.

The mechanism for effecting the lateral movement of the machine, and which may be desirable under certain conditions, is illustrated in Fig. 2. In this case the frame of the machine is provided at the bottom with suitable rollers that run upon tracks w w set upon the ground. To the front end of the longitudinal shaft are attached two drums W W and a double acting clutch W', the arrangement being similar to that of the drums and clutch at the rear of the machine, with the exception that the drums are of equal size. Two ropes, y y', are wound upon the drums W W, and their free ends are secured to the opposite ends of the forward rail w. To effect a lateral feed in either direction the clutch W' is moved over and caused to engage with the ratchet on one side, thereby causing the drum on that side to revolve and wind up its rope, thus drawing the machine to one side. While this lateral movement is being effected the clutch T should be set midway between the drums S and S', so that neither will be revolved, and there will be no forward or backward movement of the machine. Al-

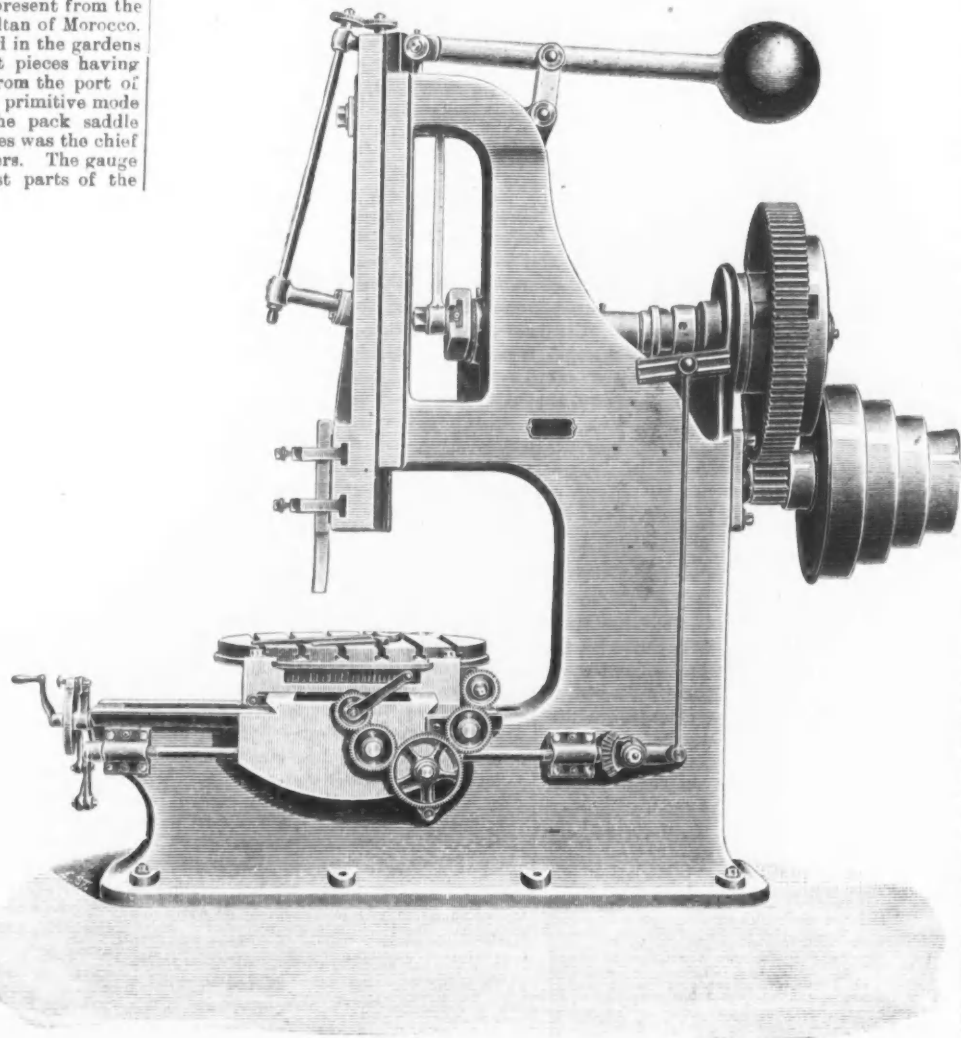


Fig. 2.—Thirteen-Inch Slotting Machine.

NEW MACHINE TOOLS, BUILT BY THE NEWARK MACHINE TOOL WORKS, EAST NEWARK, N. J.

The openings in the sides are 14 inches wide and allow the work to be passed through sideways for punching or shearing long strips. The frames are made of great strength around these openings to prevent springing. Holes of any desired size may be made in the bed to let the waste drop through. The principal feature of the press is the arrangement of the guide for the tables. It will be seen that the table is extended above the cross tie, where it is guided and tied by a cross piece. The bearings for the table are provided with gibs so that it can be kept in line without difficulty. These long bearings, so far apart, are features of the greatest importance in die work. The two pitmen give a firm support to the die and prevent any looseness in the slide. The pitmen are adjustable, and all the wearing surfaces have devices for taking up lost motion. The pressure is central. A heavy clutch stop always at the top of the stroke. All shafts and screws are of steel. The stroke is about 2 inches. The fly-wheel weighs about 550 pounds and the weight of the machine is about 2000 pounds.

In the slotting machine the ram is driven by a four-speed cone and spur gearing. The Whitworth quick return gives a rapid up-stroke and a slow cutting speed to the ram. The stroke may be varied from 0 to 13 inches, the change being quickly made by the screw on the crank disk, and the position of the ram with regard to the work may be quickly changed also by means of the rod shown on the front of the ram. The counterbalance takes up the lost motion in the pin. The work is fastened to a circular table, which is driven by a worm-wheel and gear, and which is carried on compound tables, having longitudinal and transverse motions. All three tables have self-acting feeds in both directions, the feed taking place at the beginning of the stroke and never during the cut. The feeds may be varied from 0 to 1/8 inch. The circular table may be clamped to the compound table. All the handles are within easy reach of the workman. This is an important feature, as work on the latter demands constant attention from the workman, and he should be able to operate all the feeds without stopping the machine. All the wearing surfaces are broad and scraped to a perfect bearing. All wearing screws and spindles are of steel. Following are some of the principal sizes: Large step of cone, 20 x 3 3/4 inches face; ratio of gearing, 1 to 4; circular table, 3 feet in diameter; compound table feeds, 21 inches longitudinally and 27 3/4 inches across; machine will slot to center of 57 inches; distance from tool rest to inside of frame, 27 inches; from circular table to frame, 19 inches; length of ram, 4 feet 4 inches.

## Loss of Power on Cable Roads.

According to a recent test made on the Chicago City Railway, it was ascertained that about 36 per cent. of the gross power used in running that road was required to move the empty cable. Figures were made on a day of heavy traffic, and were as follows: 1022 horse power were used to move 300 cars, only 360 of which was required to draw the empty cable. The cars were heavily loaded, perhaps 20 per cent. more than usual, and Secretary Windsor, to whom we are indebted for these facts, assures us that the amount of power required to haul the cable will not exceed 40 per cent. on the average. The Street Railway Journal says the amount of power re-

engine, the boiler and the lower frame, weigh about 660 pounds each. The power the engine can develop is 4 horse-power, and the speed is 9 miles per hour. It is a four wheeled tender locomotive on the Krauss system with water-tank frame. To save weight without reducing the strength of the single parts phosphor-bronze and steel have been freely used in its construction. The cylinder, piston, crosshead and journals are of phosphor-bronze. The firing having to be done with wood a relatively large surface (one-fourteenth of the total heating surface) has been given, and the engine has been provided with an American spark arrester. The dimensions are:

Cylinders.....	3 3/4 in. x 6 1/4 in.
Drivers, diameter.....	15 1/4 in.
Wheel base.....	27 3/4 in.
Heating surface.....	10.7 sq. ft.
Grate area.....	0.75 sq. ft.
Boiler pressure.....	180 lbs.
Tank capacity.....	50 gallons.
Weight empty.....	2,420 lb.
Weight in working order.....	3,080 lb.

This is probably one of the smallest locomotives ever made, though many engines are working regularly on a narrower gauge, 18 inches, in shops, steel works, brickyards, &c.

## A New Coal Mining Machine.

We take pleasure in presenting on this page engravings of a new coal mining machine brought out a short time ago and now in the hands of Messrs. Benson & Kendig, 39 and 41 Cortlandt street, New York.

Before entering into a description of the details of the apparatus, we will briefly remark that it was primarily designed to be operated by hand, but it will be readily understood that it is capable, with slight modifications, of being used as a power machine in connection with a suitable motor. The machine consists essentially of the usual rotary cutter, mounted in a frame, and is driven by a number of chains and ropes in the manner described below.

The engravings, which show a sectional side elevation and a plan, will give a fair idea of the nature of the design and the principles involved. The front and rear plates A and A' of the machine are connected by several long bars, as shown, in addition to which a flat plate, B, is secured to them at the middle of their lower edges. On this plate, B, the different moving parts of the machine are arranged. The ends of the plate project some distance through the end pieces A and A' and these are slotted for the passage of a bar, on which the cutter is supported, and for an endless driving chain. The bar, designated by the letter C, carries the cutter head at one end and its operating mechanism at the other, the cutter-head, or front, end being elevated as shown to such an extent that the bottom of the head is level with the top of the remainder of the bar. The cutter-head itself, D, is composed of a disk having a flange projecting downward and a central hub, which rests upon the head C, a projecting boss upon the latter fitting into a cavity in this hub. A screw, moreover, passes through the center of the hub and the head, and secures a sprocket wheel E, as shown in Fig. 1. The disk, of which the nature of the outline is shown in Fig. 2, is fitted with cutters g, which are slightly wider than the flange of the disk already referred to, so as to cut a channel of sufficient width to permit the entrance of the cutter-head. The hub of the disk D is coggled, and its teeth mesh with the teeth of several cog-wheels H, which are properly secured by screws. On

slot, through which passes a vertical shaft, J'. To the lower end of this shaft is attached a sprocket-wheel, E', similar to the wheel E already mentioned, and around these two wheels passes an endless chain, K. On the top of the block C' is formed a flange, H', Fig. 2, which embraces and guides a collar through which the vertical shaft J' passes. A bolt and nut, Fig. 1, hold this

mechanism is necessarily slow and dependent upon the power applied, the backward movement is not necessarily so, and, in fact, a rapid return of the cutter head is desirable. To accomplish this end the following mechanism is provided: To the back of the plate A' are secured two brackets, in which is journaled a horizontal shaft, R, carrying two drums, S and S', both loose on the

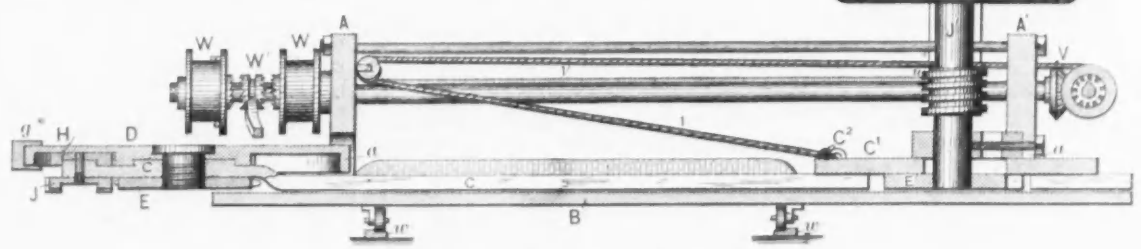


Fig. 1.—Side Elevation and Section.

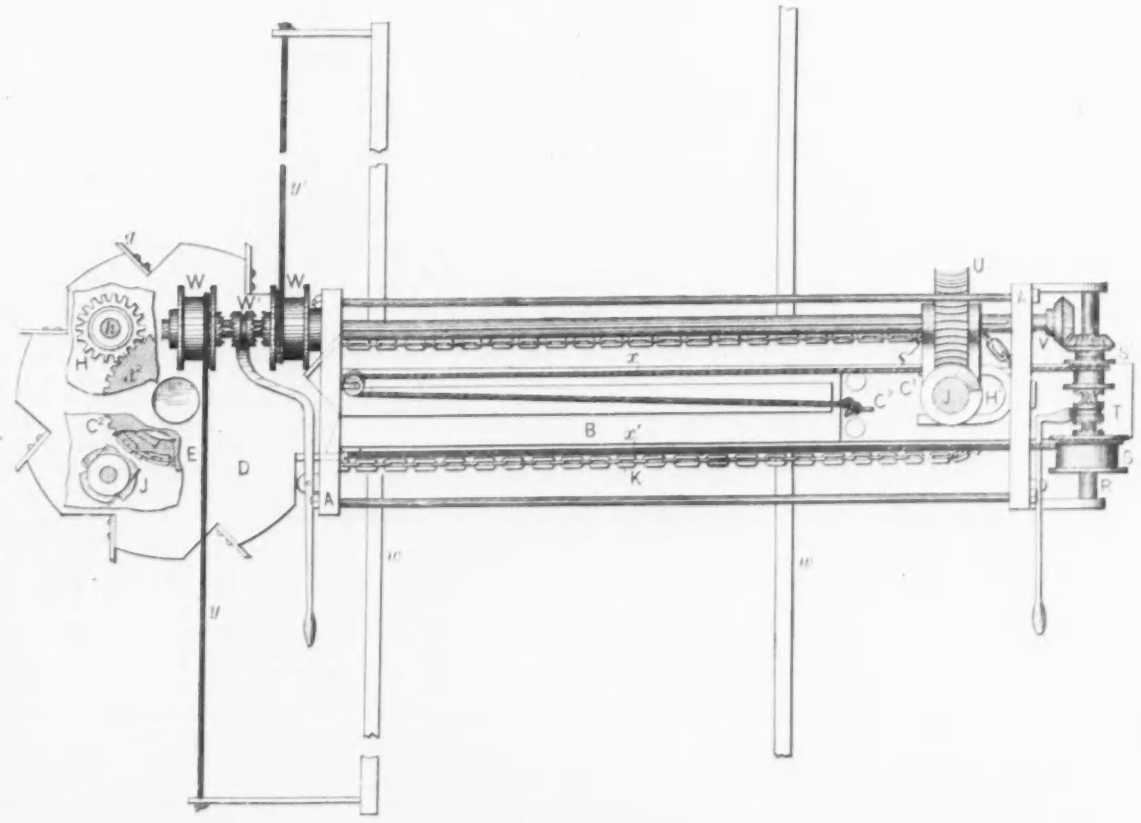


Fig. 2.—Plan.

A NOVEL COAL-MINING MACHINE, BUILT BY BENSON &amp; KENDIG, CORTLANDT ST., NEW YORK.

collar at any desired point, and thus admit of regulating the tension of the driving chain K. The shaft J' is furnished with a small fly-wheel, L, and is supported by an L-shaped bracket. The way in which power is applied will be readily understood from Fig. 1, a pair of bevel gears being provided for the purpose.

Having described the cutting mechanism and its connections, we will now describe

shaft, and provided with a sliding clutch, T. This is very clearly shown in Fig. 2. Motion is communicated to the shaft R by a worm-wheel, U, and a worm, u, and a beveled pinion on a shaft which runs from end to end of the machine, and is journaled in the plates A and A'. A feather on this shaft extending from the plate A to the plate A' permits the worm-wheel U to move that distance along the shaft, imparting motion to

together the latter embraces a number of interesting features, and seems to meet the requirements of satisfactory work.

The Scranton Steel Company, of Scranton, Pa., has lately made an excellent week's run. In eleven turns they made 637 heats, producing 4212 tons of ingots and turning out 3670 gross tons of rails.



# Trade Report.

## British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, December 14, 1887.

A firm tone obtains in the Iron and Steel trades in all sections. The excitement at Glasgow resulting from the failure of Messrs. Armstrong has subsided, and "warrants" have since moved steadily upward. The closing price to-day was 45/6, against 42/10 a week ago. The shipments of Scotch Pigs continue very steady. Production is still heavy, but the market is little affected thereby, makers' prices having advanced about 2/ on the average during the week. West Coast Hematites show a further rise of 1/ at 1/6, and Cleveland Pig is 1/ higher. Freight has again advanced. The output of Steel Rails is noticeably large at the present time, and makers have not adhered to the higher prices asked last week. Blooms are rather weak, but Billets and Slabs are held higher, and a slight advance is also quoted for Wire Rods.

The situation in the Tin-Plate trade has not changed materially the past week. Prices are very firm, but the business passing is unimportant. The exports to the United States during November were 18,000 tons, against 17,000 tons the corresponding month last year.

The Gwendraeth Plate Works, at Kidwelly, operated by Messrs. J. Chivers & Son, have been shut down. The firm were makers of the Glyn Steel Cokes and Gwendraeth Charcoals. They own nine mills.

With respect to the Tin syndicate operations nothing new transpires. The clique is said to hold fully 10,000 tons, and the belief is general that they stand ready to buy all fresh supplies that may be offered for some time to come. The Copper speculation has been excited, with about £7 advance for the week, and Spelter is again very strong after a temporary set back.

**Scotch Pig.**—The market has been active and more or less excited, with prices to-day as follows:

No. 1. Cottess, f.o.b. Glasgow.	54/
No. 1. Summerlee, " "	52/
No. 1. Gartsherrie, " "	49/
No. 1. Langloan, " "	49/
No. 1. Cambro, " "	49/
No. 1. Shotts, " "	49/
No. 1. Gleggarnock, at Leith.	49/
No. 1. Dalmellington, " "	45/9
No. 1. Eglinton, " "	45/9

Steamer freights, Glasgow to New York, 10/; Liverpool to New York, 10/ 12/6.

**Cleveland Pig.**—There has been an active market and prices have further advanced. No. 1 Middlesboro', G. M. B., 36/6; No. 3 do., 33/9, f.o.b.

**Bessemer Pig.**—Prices have again advanced under fairly active demand. West Coast brands, mixed numbers, 47/6 @ 48/ f.o.b.

**Spiegelisen.**—Business moderate and prices without change. English 20¢ quoted at 70/ f.o.b.

**Steel Rails.**—At concessions from last week's prices there has been a good trade. Standard sections, £4 @ £4. 4/5, f.o.b.

**Steel Blooms.**—Demand is slow and prices are rather weak. We quote at 75/ @ 77/6, f.o.b., for 7 x 7.

**Steel Billets and Slabs.**—The market firm, with demand fair. Bessemer 2 1/2 x 2 1/2 inch Billets, £4 @ £4. 2/6, and Nail Slabs, £4 @ £4. 2/6, f.o.b.

**Steel Wire Rods.**—Demand moderate, but prices held firmly. Mild Steel, No. 6, quoted at £5. 15/ @ £5. 17/6, f.o.b.

**Old Rails.**—There is but little doing, but holders are firmer. Tees quoted at £2. 15/ and Double Heads, £2. 17/6 @ £3, f.o.b.

**Scrap Iron.**—The demand moderate and prices unchanged. Heavy Wrought, 42/6 @ 45/ f. o. b.

**Crop Ends.**—Moderate demand, but prices steady. Bessemer, quoted £2. 7/6 @ £2. 10/ f.o.b.

**Tin Plate.**—The market very steady in tone, with demand good. We quote, f.o.b. Liverpool:

IC Charcoal, Allaway grade.	16/9 @ 18/
IC Bessemer steel, Coke finish.	15/3 @ 15/
IC Siemens " "	15/6 @ 15/
IC Coke, B. V. grade.	15/3 @ 15/6
Charcoal, Terne, Dean grade.	14/3 @ 14/9

**Manufactured Iron.**—There has been a better general demand. Prices a shade higher for Welsh Bars.

Staff. Ord. Marked Bars.	6 10 0 @ 7 10 0
" Common "	4 17 6 @ 5 0 0
" B's sheet, singles "	6 5 0 @ 6 7 6
" Common Hoops "	5 0 0 @ 5 10 0
Welsh Bars (at Wales).	4 10 0 @ 4 12 6

**Tin.**—Trading has been moderate. Straits closed at spot, and £145/3, three months' futures.

**Copper.**—The market active and excited. Chili Bars closed at £77 @ £77. 2/6; Best Selected, £80 @ £81.

**Lead.**—Market quiet, and barely steady. Soft Spanish, £14. 2/6 @ £14. 7/6.

**Spelter.**—The demand active and the market strong. Silesian, ordinary, £19.

## Financial.

OFFICE OF THE IRON AGE.  
WEDNESDAY EVENING, December 14, 1887.

Tariff discussion and various schemes introduced in Congress have had a somewhat distracting influence in business circles, and this circumstance, together with the natural indisposition to push new enterprises just as the old year is going, causes a lessened move-

ment in the markets for general merchandise. Speculation, too, has come to a halt, except in the market for copper, which is about 7¢ higher than before the skyward movement commenced. Wheat, after wide fluctuations, shows no radical change; exports light. The Cincinnati Price Current figures an aggregate increase of 258,000,000, or 21 1/2 %, compared with the short crop of 1881. Cotton is 1/8¢ higher. Wool remains comparatively undisturbed. Coal is again plenty, except in districts dependent on Lehigh Valley, respecting which the operators give no encouragement.

Ex-Secretary McCulloch, in reference to current topics, expresses the opinion that too much importance has been attached to the cry about the alleged gigantic Treasury surplus, for which the Stock Exchange is chiefly responsible. He never knew the price of American produce to be low for lack of money to buy it, but overproduction has frequently forced prices down. Mr. McCulloch refers to the difficulty of discussing national topics from an independent standpoint, and suggests the appointment of a commission divorced from party policy to observe the operation of existing laws and formulate legislation that might be productive of good results. Senator Farwell introduced a proposition to make State, municipal and railroad bonds the basis of national bank circulation, which meets with little favor.

The Stock Exchange markets have had a downward tendency. On Thursday there was a sharp decline, the bears attacking the coal shares, Richmond terminal and other specials, and similar influences prevailed on Friday. On Saturday the market was dull and uninteresting. On Monday there was no news to influence operations, and the tone was generally depressed. On Tuesday there was a partial rally, but bears used the recommendations with good effect, and the tone was unsettled. To-day prices advanced for the single reason that the market was oversold.

United States bonds at the close were as follows:

U. S. 4 1/2 %, 1891, coupon.	107 1/4 @ 107 3/4
U. S. 4 1/2 %, 1907, coupon.	125 1/4 @ 125 3/4
U. S. Currency 6s, 1895.	119 @ 120
U. S. Currency 6s, 1896.	121 1/4 @ 121 3/4
U. S. Currency 6s, 1897.	123 1/4 @ 123 3/4
U. S. Currency 6s, 1898.	125 1/4 @ 125 3/4
U. S. Currency 6s, 1899.	127 1/4 @ 127 3/4

The Comptroller of the Currency in his annual report discusses the general subject of bank circulation and shows the great changes that have taken place in extinguishing the 3 % loan. Between August 12, 1886, and July 1, 1887, nearly \$102,000,000 of 3 % bonds were surrendered by the banks for redemption, and replacements were made in 4 and 4 1/2 % bonds to the amount of \$20,000,000; while during the same time new banks deposited 4 and 4 1/2 % bonds to the amount of \$4,532,300, and the amounts of these bonds held to secure deposits of public moneys increased by over \$12,000,000. Thus fully \$37,000,000 of 4 and 4 1/2 % bonds were obtained by the banks and transferred to the Treasury within less than 12 months without exciting any speculative advance in the premium of either loan. The Comptroller remarks that "it is of great importance for Congress to observe the perilous contingencies involved in the existence of the present relations between the public debt and the National bank circulation."

The bank statement showed an increase of \$361,475 in surplus reserve, owing to a decrease of \$2,083,900 in deposits. In loans there was a contraction of \$1,473,000. These changes left the surplus reserve standing at \$6,207,200, compared with \$4,080,500 this time last year. While call money is more easily obtainable there is no change at the banks, which are doing nothing in outside paper. Rates on the last named are: 6 @ 6 1/2 %. At the West there is an active demand. The Chicago Tribune says that for legitimate business purposes there is a fair supply of funds, but persons with speculative schemes to promote are turned away from the banks empty-handed. The packers are large borrowers. Merchants have apparently abated nothing of their claims on their bankers. They seem to need all the funds they can get. Collections are not specially good. That could hardly be expected when in the large and thrifty towns of the Northwest money is lending for legitimate purposes at 10 @ 12 %.

The exports of specie from this port last week amounted to \$597,000, and the total since January 1 is \$16,989,000, as compared with \$46,989,000 for the corresponding period last year. The imports for the same period were \$162,000, making a total since January 1 of \$39,445,000, against \$31,260,000 for the corresponding period in 1886. Foreign exchange continues depressed, and rates are close on to the gold importing point, but a movement of specie in this direction is not probable immediately owing to the large sums falling due January 1 for interest and dividends to foreign holders of our securities.

The trade reports are of a slightly smaller volume of business, but the aggregate is unusually large. The bank clearings of 36 cities last week amounted to \$1,029,212,011—a decrease of 15.3 % as compared with the same time in 1886. Outside of New York there was a gain of 3.5 %, the clearings at this center being only \$651,852,043, against \$660,751,302 last year. Boston also showed a loss of 1 %. The falling off in that city, and in New York, was due to a diminished volume of speculation in securities. St. Joseph reported an increase

of 94.4 %; Omaha, 44.6; Duluth; 42.8; Philadelphia, 14.4; San Francisco, 10.1; St. Louis, 8.9, and Chicago, 8.6 %.

The imports of merchandise at this port during the week were valued at \$7,973,000, of which \$1,868,000 represents dry goods. Since January 1 the total is \$140,952,760, as compared with \$410,809,850 for the corresponding period in 1886 and \$372,054,800 in 1885. The imports of merchandise at this port for November amounted to \$38,300,880, against about \$35,000,000 for the same month last year, and are the largest on record in the history of the trade for any corresponding month. Only for the fact that the specie movement recently has been very small the imports for the year would be in excess of any former total. Even as it stands, there is but one year that outranks it, and in that year it was the volume of specie imported that swelled the amount for 11 months to nearly \$500,000,000. Turning now to the exports, the total for November is small, only slightly exceeding \$27,000,000. The exports of merchandise from this port during the week amounted to \$6,483,418, and the total since January 1 is \$294,460,000, against \$309,080,000 for the same time last year and \$316,733,000 in 1885. The items include 121,000 barrels of flour, 18,342 bales of cotton and 4,648,000 gallons of petroleum.

Upon the silver dollar question the Treasurer says it is a waste to coin and store any more of them at present. The \$214,000,000 now in the Treasury will more than suffice to redeem, as they may be presented, the outstanding silver certificates, or those that can be issued for years to come. The law, he thinks, should be amended so as to authorize the Secretary to issue certificates against the coining value of the bullion bought, and to coin only such number of dollars as he might deem expedient hereafter. The bullion should be melted into very heavy bars which could not be easily stolen or lost. He recommends the formation of a "silver reserve" in addition to that held against the outstanding certificates sufficient to supply any popular demand for silver.

A list is published of depositors in failed savings banks who are entitled to receive unclaimed dividends, and may get their money if they will take the trouble to ask the Bank Superintendent at Albany for it. This State now holds something like \$100,000 saved from the assets of these defunct savings banks. From the year 1871 to 1879 29 of the savings banks of the State failed, and their affairs were placed in liquidation by the courts. The total amount of deposits involved by these failures was in round numbers \$15,000,000. Of this sum about \$10,000,000 has been returned to depositors by way of dividends. Twenty-one of the failed savings banks were in the city of New York. The affairs of 13 of these defunct institutions have been closed.

The newly organized Hamilton Bank, capital \$500,000, will soon commence business on Broadway above Prince street; Douglas R. Satterlee, of the Bedford Bank, Brooklyn, president.

A San Francisco dispatch says that a Scotch syndicate has been formed to reorganize the Bank of Nevada, so badly shattered by the disastrous wheat deal of last June.

The failures of the week include that of the commission house D. De Castro & Co., of this city, for the last 30 years in the South American trade. Many of their bills of exchange, previously sold to parties in this country and Europe, have been returned dishonored.

## NEW YORK.

**American Pig.**—Before the publication of the President's message Mr. B. G. Clarke, President of the Thomas Iron Company, had, as he states, made up his mind to open the prices for next season at an advance of \$2 per ton on No. 1 and \$1 on No. 2 foundry—that is, \$22 and \$20. He has now reconsidered his decision, but is not yet prepared to make his announcement. It may be questioned whether there will be any advance at all. The situation is peculiarly mixed. Both consumers and producers all over the country are exceptionally bare of stocks; consumption continues heavy and urgent, while production is falling off somewhat through the blowing out of furnaces on the Lehigh since the 1st inst., and the prospect of further additions to the idle furnaces; Costs are high and prices unsatisfactory even now. What pressure there is from the South is small, and the only element of possible weakness from that quarter is the tightness of money in at least one of the Southern Iron centers. Buyers have been holding off persistently for a long while, and there are indications that some of them are covering for fear of the rush for Iron which may come in January. On the other hand, the situation in Rails, affecting as it does the outside furnaces now running on Bessemer Pig, is unfavorable, and even now come reports of two furnaces which have been running on that grade turning on Foundry Iron. It is not without the range of possibility that furnaces connected with Steel works may be turned on to Foundry Iron. The feeling is that it will depend entirely upon the opening prices what policy consumers will follow. Whatever they may be, buyers will probably cover a part of their requirements at the prices fixed, and some will be disposed to take their chances on the latter

half of the year, when undoubtedly the new Southern plants will become a more prominent factor in the market. We continue to quote: No. 1 Foundry, \$20.50 @ \$21.50; No. 2, \$19 @ \$19.50 and Gray Forge, \$16.25 @ \$16.75.

**Scotch Pig.**—Little business is reported, and the prices now asked in consequence of the advance in Iron and in freights abroad are higher, relatively, than the prices for domestic Iron. During the advance about 3000 to 4000 tons in the aggregate have been placed, these sales covering the last two weeks. Importers are finding it a very difficult matter to engage freight room, since a good deal of it is taken by heavy shipments of potatoes. We quote Coltness, \$21 @ \$21.50; Dalmellington, \$20 @ \$21; Gleggarnock, \$20.50 @ \$21; Summerlee, \$20.75 @ \$21; Clyde, \$20.25 @ \$20.50, and Eglinton, \$19.50 @ \$20.

**Structural Iron.**—There have been a number of large contracts closed lately, and a good deal of additional work is in sight. Still the market is not as strong as it has been, and while quotations remain the same some makers show a disposition to offer to "protect the buyer" against a decline. In fact, an order for 3000 tons was lately taken under such conditions. We quote for large quantities: Angles, 2.40¢ @ 2.55¢; T's, 2.80¢ @ 2.85¢; Bridge Plate, 2.3¢ @ 2.5¢; Channels and Beams, 3.30¢ base, on dock.

**Bar Iron.**—The order for 3000 tons alluded to in our last was for the car works of the New York Central Railroad, for winter delivery. It is reported to have been placed at close figures. We quote: Common Bar, 1.80¢ @ 1.85¢; Medium, 1.85¢ @ 1.95¢; and Refined, 2¢ @ 2.30¢, in round lots, on dock.

**Plates.**—The market is weaker in Steel, the competition of cheap foreign Plates, notably for Tanks, Ship and similar Plates, is telling, such foreign Steel selling at 2.05¢ @ 2.10¢ for Flange and 2.40¢ @ 2.50¢ for Shell. The 45 ¢ ad valorem duty on Steel Plates allows the latter to come and sell at less than Iron Plates. We quote Iron Plates, 2.30¢ @ 2.35¢ for Tank; 2.45¢ @ 2.6¢ for Shell; 3.5¢ @ 3.6¢ for Flange.

**Steel Rails.**—The moderate buying movement continues, although the majority of buyers still hold back. Thus the Pennsylvania order is still in suspense, and with it other contracts practically contingent upon its closing. Among the latter is at least one large railroad with a lot of over 10,000 tons. We can report sales aggregating fully 22,000 tons, partly for early delivery, with negotiations pending for at least 50,000 tons, among which is 30,000 tons for a Southern and Northwestern system and 10,000 for a Northwestern road. Thus far the sales have been almost exclusively to railroads east of the Mississippi and north of the Ohio River, the mills east of the Allegheny Mountains taking nearly all the orders. According to the report of the Board of Control the sales of Rails for 1888 delivery up to December 1 footed up to 128,000 out of an allotment of about 848,000. But of these sales from 60,000 to 65,000 tons are extensions of this year's contracts, so that the new business up to December 1 was only between 60,000 and 65,000 tons. With later sales the aggregate of new business for next year is certainly not more than 100,000. This is corroborated by the following figures: The sales for 1887 delivery reported up to December 1 aggregated 1,808,444 gross tons. The actual shipments to that date were 1,726,108. This leaves about 172,000 tons to be made in December. Now nearly all the mills have run slack during December so far. Some have already closed down entirely and others are about to do so. Thus it is possible not alone to account for the postponed contracts referred to in the above, but it becomes very evident that some of the sales reported are entirely off. At a number of the mills a very large quantity of Rails is stacked up. Such is the situation as it is to-day so far as the mills are concerned. There can be no doubt that the possibility of the tariff agitation has lately contributed toward prolonging this state of affairs. It has given encouragement to the railroad companies in adhering to their policy of holding off. In spite of the heavy requirements known to exist, the buyers are keeping out of the market, and we have direct evidence that the President's message has driven buyers out of the market who were negotiating. It has given them an advantage which they have been quick to seize. The result is that nine tenths of the mills, large or small, have not orders enough to warrant even moderate running during January, and, unless work is secured during the balance of the year, not more than two or three mills in the country will be running at all, and then only on short time. West of the Allegheny Mountains every mill will close down between now and the first of January. Of course this does not mean any hardship to the mills for a short time, because they will utilize the time to make needed repairs, &c. But the happenings of the past 10 days may possibly prolong the trial of strength between the railroads, who are undoubtedly acting in concert, and the mills. We are far from sharing the pessimistic views paraded in the newspapers for effect in financial and political circles. The railroads will need a heavy amount of material and have got the money to pay for it. The estimates of the requirements of one great system, west of the Mississippi River, are 150,000 tons alone, but railroad managers seem determined to break down the price of Rails, and it is a matter

for surprise to find, apparently, on that side a trunk line which could do much to relieve the situation by taking the lead. The tonnage it gets from the mills on its line would alone seem to warrant a liberal course. It is reported that this company insists upon being protected against a decline, the tariff agitation offering a pretext for such demands. They have already been conceded in isolated cases. We continue to quote \$32 @ \$33 for standard sections.

**Wire Rods.**—Only a small business has been done. We quote \$40.50 @ \$41.

**Old Rails.**—The only sale reported is a lot of 500 tons of American Tees at Jersey City. We are informed that an offer of 5000 tons of Double Heads from the West at private terms has been declined. The majority of consumers claim that they will not come into the market until they have made sales of manufactured goods. Abroad there has been a heavy buying movement for Italy in anticipation of the increase in the duties in spring.

## Metal Market.

**Copper.**—On Thursday of last week Chili Bars were cabled from London £70. 15/ and firm, with sales for the day of 1050 tons, while in New York there was a fair amount of trading, sales reaching 425,000 lb at 16.55¢ @ 16.60¢ for January, 16.65¢ for February and 16.60¢ for April. On Friday London advanced to £71. 7/6, sales amounting to 1150 tons. Here the advance continued, though the speculative movement was a small one, sales summing up 275,000 lb at 16.65¢ for December, 16.70¢ @ 16.75¢ for January, 16.80¢ for February and 15.85¢ @ 16¢ for May. On Saturday Copper in this market was but moderately active and irregular, sales figuring up 450,000 lb, including spot at 16.60¢ @ 16.65¢, December at 16.65¢, January at 16.80¢, and February at 16.90¢ @ 16.95¢. On Monday fresh impulse was given to the speculative movement by a telegram from Calumet, Mich., December 10, which had been published the day before, reading as follows: "The fire which for the past month has been burning in the Calumet & Hecla mine gave the greatest evidence of its effect at noon to-day, when the ground about the main engine shaft caved in about 15 feet. This was immediately followed by the emission of dense volumes of smoke and gas. The cave-in spread to all the ground between the main engine shaft and the No. 1 Hecla. The first cause of all the trouble at the mine is found in the fact that the hanging wall—that is, the rock left overhead, as longitudinal drifts are made—is bad, and likely to fall at any time if not supported by heavy timbers. There is a whole forest of timber in the mine, and it is this timbering that is now on fire. More than an acre of ground has fallen in, and the settling may continue. The most serious aspect in this cave-in at present lies in the fact that the fire in the mine will thus find vent and draft and probably break out in renewed force." London came £73. 5/, with sales of 875 tons, while here the market was higher and moderately active, with a turnover of 475,000 pounds at 17.20¢ @ 17.45¢ for December; 17.25¢ @ 17.50¢ for January, and 50,000 pounds, Baltimore, January, at 15¢. On Tuesday Chili Bars rose to £75. 2/, with sales of 625 tons, the sales in our own market being 475,000 lb all told, of which spot at 17.50¢; 17.60¢ @ 17.65¢ for December, 17.70¢ @ 17.80¢ for January and 18¢ for March. Meanwhile advices from the Calumet and Hecla fire were more encouraging, the officers of the company stating that the first reports were greatly exaggerated, and that they expect the effect of the fire to be much less than supposed. This morning Chili Bars came £76. 5/, and on the first call and between calls altogether 525,000 lb were sold at 17.45¢ @ 17.60¢, spot, closing at 17.55¢, and 17.85¢ @ 18¢ January. We called this morning at the Calumet and Hecla office, when Mr. Jacob told us that the cave in was 10 feet square and no more; that it might as well have happened in summer or any other time of the year, and that it was, if anything, an advantage, the melting of snow being the cause. It gave the officers in charge of the work a chance to examine the state of affairs during several hours, so as to form some idea about getting the fire under control—in a word, that the whole thing had been grossly exaggerated. The products of mineral of the seven leading Lake Superior mines for November aggregated 4033 tons, against 4661 in October, and an average of 3742 tons for the first ten months this year. For eleven months these mines produced 41,450 tons, against 42,786 tons the same time last year and 37,547 tons the same time in 1885. The Calumet and Hecla output in November was 2291 tons, against 2954 in October, and an average monthly product of 2475 tons the first ten months of this year. The product for the first week in December was 337 tons of mineral, which yields about 75 % of Ingot Copper. Messrs. James Lewis & Son, Liverpool, December 1, remark in their circular: "It is evident from the moderate charters received to-day that it will be some time before Chili can increase its production, all the Copper available for shipment for some time to come having been chartered for far ahead. So far, therefore, as we can judge the supplies of Copper cannot show much increase for the next four or five months, while the quantity of furnace material at present available unsold is confined to 380



# Trade Report.

tons. Mason's Precipitate Smelters will therefore have to fall back on the stock of Bars, now reduced to 33,574 tons in England and France, and pay the syndicate such prices as they choose to ask. Import of American Copper into Liverpool and Swansea the first eleven months 14,087 tons, against 12,930 in 1886 and 22,751 in 1885.

**Tin.**—The London Market did not swerve from £.66, spot, and £1.15, three months, on the 8, 9, 12 and 13 sales for the four days, aggregating 170 tons, while here the ensuing sales were made: Thursday of last week 30 tons, January, at 34.45¢ @ 34.60¢, and 20 tons, February, at 33.50¢; Friday 20 tons, February, at 33.45¢; Saturday closing quiet at 35.15¢ @ 35.35¢, spot, and 33¢ @ 33.35¢, futures, 10 tons, December, bringing 35¢. On Monday our market became easier, the following lots changing hands: 10 tons, spot, at 35.4¢, 20 tons, February, at 33.30¢ @ 33.60¢, and 40 tons, March, at 32.35¢ @ 32.50¢. On Tuesday 10 tons, February, were taken at 33.30¢. This morning London came unaltered, and 10 tons, January, sold at 34.4¢. Messrs. Thormann & Co., Rotterdam, November 30, publish an interesting table showing the Banca auctions held by the Netherlands Trading Company during the 10 years 1878 to 1887, both inclusive, together with the lowest, highest and average price realized each year. From these statistics it appears that the average annual amount of Banca sold was 131,796 slabs, and the average price fetched during the 10 years 56.33 guilders @ 50 kilos, while on November 30 the price stood 98.87½, which was also the average of the sale of that day of 23,343 slabs. The lowest average in any one of the 10 years was in 1878, when it was 39.07 guilders. The visible supply of Banca and Billiton in Holland on November 30 was 168,050 slabs, against 140,763 November 30, 1886, and 143,804 on November 30, 1885. **Tin Plates.**—Business in Tin Plates in the New York market has been quiet during the week, with prices fully sustained. Makers in Wales do not care naming prices, it would appear, except very full ones. The maker of the Glyn Cokes has failed because he was so heavily under contracts from the time before the advance that he was obliged to suspend. We quote at the close on a strong market, large lines, ½ box: Siemens-Martin Steel, Charcoal Finish, \$5.25 @ \$5.50; ditto, Coke Finish, \$5 @ \$5.12½; Ternes, \$4.62½ @ \$4.75, and Coke Tins, \$4.90 @ \$5. Liverpool is strong at 17 @ 18 Charcoal and 15½ @ 15½ Coke Tins.

**Lead.**—Hardly anything transpired on the spot, the little done being at 4.85¢ @ 4.95¢, and the market closing at 4.80¢ @ 4.85¢ for Common Domestic. Of February delivery 200 tons were sold during the week at 4.90¢. In England, £14. 10/ is the quotation to-day for Soft Spanish, and £15 for English Pig, a decline in both of 5/ for the week. At the Metal Exchange to-day 32,500 lb. January, were taken at 4.95¢. Lead manufacturers are quoted at the following figures: Lead Pipe, 7½¢; Sheet Lead, 8½¢; Tinned Lead Pipe, 15¢; Block-Tin Pipe, 15¢; Drop Shot, 25 lb bag, \$1.40; do., 5 lb bag, 35¢; Buck and Chilled, 25 lb bag, \$1.75; and do., 5 lb, 40¢.

**Spelter and Zinc.**—The market for common Domestic Spelter has been quiet and firm, but featureless at 5.30¢ @ 5.70¢ as to brand asked, but little moving off thereat. In London Silesian, which stood £18. 5/ a week ago, is now quoted £19. The nominal price here is 6¢ @ 6½¢. Sheet Zinc is active and firm at 6½¢ @ 7¢, domestic.

**Antimony.**—Has become unsettled because of scarcity and the advance in London, where Hallett is worth, as heretofore, £42 and Cookson £46; the nominal quotation for the latter is 12¢ @ 14¢, and of the former 11¢ @ 12¢.

## New York Metal Exchange.

The following sales are reported:

THURSDAY, December 8.	
25,000 lb Copper, January.....	16.55¢
10 tons Tin, January.....	34.45¢
10 tons Tin, January.....	34.60¢
10 tons Tin, February.....	33.50¢
25,000 lb Copper, January.....	16.55¢
50,000 lb Copper, January.....	16.55¢
25,000 lb Copper, February.....	16.55¢
100,000 lb Copper, January.....	16.55¢
50,000 lb Copper, February.....	16.55¢
75,000 lb Copper, January.....	16.55¢
10 tons Tin, February.....	33.50¢
FRIDAY, December 9.	
25,000 lb Copper, May.....	15.90¢
25,000 lb Copper, May.....	15.85¢
50,000 lb Copper, January.....	16.70¢
25,000 lb Copper, January.....	16.60¢
50,000 lb Copper, January.....	16.60¢
25,000 lb Copper, February.....	16.55¢
100,000 lb Copper, January.....	16.55¢
50,000 lb Copper, February.....	16.55¢
75,000 lb Copper, January.....	16.55¢
10 tons Tin, February.....	33.50¢
SATURDAY, December 10.	
25,000 lb Copper, February.....	16.90¢
50,000 lb Copper, January.....	16.90¢
25,000 lb Copper, spot.....	16.85¢
25,000 lb Copper, spot.....	16.85¢
25,000 lb Copper, January.....	16.90¢
100,000 lb Copper, February.....	16.90¢
50,000 lb Copper, February.....	16.90¢
25,000 lb Copper, spot.....	16.85¢
16 tons Lead, February.....	4.90¢
100 tons Lead, February.....	4.90¢
16 tons Lead, January.....	5.40¢
50,000 lb Copper, January.....	16.90¢
50,000 lb Copper, December.....	16.85¢

25,000 lb Copper, spot.....	16.60¢
25,000 lb Copper, January.....	16.90¢
0 tons Lead, January.....	4.80¢
MONDAY, December 12.	
25,000 lb Copper, December.....	17.20¢
50,000 lb Copper, January.....	17.15¢
16 tons December, Lead.....	18.80¢
25,000 lb Copper, January.....	17.10¢
50,000 lb Copper, January.....	17.10¢
10 tons Spot Tin, February.....	33.45¢
10 tons Tin, February.....	33.35¢
10 tons Tin, February.....	33.35¢
10 tons Tin, March.....	32.35¢
10 tons Tin, March.....	32.40¢
10 tons Tin, March.....	32.45¢
25,000 lb Copper, January.....	17.15¢
25,000 lb Copper, December.....	17.15¢
25,000 lb Copper, December.....	17.30¢
25,000 lb Copper, December.....	17.35¢
25,000 lb Copper, January.....	17.15¢
25,000 lb Copper, January.....	17.15¢
100,000 lb Copper, December.....	17.05¢
200 tons Lead, February.....	4.90¢
TUESDAY, December 13.	
100,000 lb Copper, January.....	17.15¢
50,000 lb Copper, January.....	17.15¢
100,000 lb Copper, March.....	18.00¢
10 tons Tin, February.....	33.40¢
75,000 lb Copper, December.....	17.65¢
50,000 lb Copper, January.....	17.15¢
50,000 lb Copper, spot.....	17.15¢
50,000 lb Copper, spot.....	17.15¢
25,000 lb Copper, December.....	17.65¢
25,000 lb Copper, January.....	17.65¢
WEDNESDAY, December 14.	
10 tons Tin, January.....	34.75¢
100,000 lb Lake Copper, spot.....	17.50¢
25,000 lb Lake Copper, spot.....	17.45¢
100,000 lb Lake Copper, January.....	17.85¢
50,000 lb Lake Copper, January.....	17.90¢
25,000 lb Lake Copper, January.....	17.95¢
25,000 lb Lake Copper, January.....	18.00¢
25,000 lb Lake Copper, spot.....	17.90¢
125,000 lb Lake Copper, spot.....	17.55¢
25,000 lb Lake Copper, December.....	17.70¢
50,000 lb Lake Copper, January.....	17.80¢
25,000 lb Lake Copper, February.....	18.00¢
32,500 lb Lead, January.....	4.95¢

## Philadelphia.

Office of The Iron Age, 230 South Fourth St., PHILADELPHIA, Pa., December 13, 1887.

**Pig Iron.**—There has been very little disposition to do business since the President's message was made public. No one imagines that its recommendations will be carried into effect, but all the same it has completely upset business for the time being, and it is hard to say when there will be a recovery. The effect is seen on the entire market; everything can be bought at lower prices, but there is no demand except for trifling lots to pull through with until the end of the year. This depression may, of course, be only temporary, and due, perhaps, in some measure to other causes than the President's message, but, if it is, the coincidence is a remarkable one. The effect was instantaneous, however, and ever since prices have been drooping and the demand dwindling away to a mere nothing. Dullness is not unusual at this season, but the indisposition to buy for next year's delivery shows what uncertainty of feeling there is. If the general position was not thoroughly sound the effect would have been disastrous, but with light stocks and comparatively low prices nothing serious need be expected at present. But while this cloud overshadows the market improvement is out of the question, all that can be hoped for is that things may not get much worse, and that relief will come in time to avert disaster. For the present the disposition is to wait the course of events; buyers will wait, so will sellers, as they are in good shape for so doing, but there is no reason to suppose it will effect consumption for any length of time. Prices for good brands of Pig Iron remain at about \$20.50 @ \$21.50 at tide for No. 1 Foundry; \$19 @ \$19.50 for No. 2 and \$16.75 @ \$17 for Gray Forge. Buyers cannot be found for large lots at these prices, but in the meantime sellers are not in a position to quote lower figures unless cost of production can be reduced in proportion.

**Foreign Iron.**—Nothing doing, and prices are entirely nominal at from \$19.50 to \$20 asked for Bessemer, c.i.f., duty paid, and \$26.75 @ \$27 for 20 x 20 Spiegel. There is some talk of Domestic Bessemer made from Foreign Ore being sold in round lots, but nothing definite is known except that \$19 @ \$19.50 is asked for the run of the furnace, f.o.b. cars.

**Blooms.**—Nothing doing, and prices are entirely nominal; asking rates as follows: \$30.50 @ \$31 for Nail Slabs; \$31.50 @ \$32.50 for 4 x 4 Billets, \$35 @ \$36 for Siemens-Martin. Domestic Blooms as follows: Steel, from \$31 to \$35, f.o.b. cars at mill, according to analysis; Charcoal Blooms, \$53 @ \$54; Runout Anthracite, \$45 @ \$46; Scrap Blooms, \$38 @ \$39 "bloom" ton.

**Muck Bars.**—Market quiet, with \$30.50 @ \$31 at furnace asked. Small lots taken at these figures.

**Far Iron.**—Business could hardly be duller than it has been during the past week. Most of the mills are running pretty nearly on full time, but orders are not coming in in anything like proportion to deliveries, nor are there any indications of an early renewal of the demand, although we do not hear of much falling off in consumption. The feeling is rather gloomy, however, and there is little doubt that prices would be shaded somewhat liberally on offers for good-sized lots, but such are not on the market at present. Nominal quotations are from 2¢ to 2.1¢ for Best Refined Bars, but it is doubtful if the inside figure could be realized on a large order. Skelp is quoted at 1.95¢ @ 2¢, but there is no demand at present.

**Plate and Tank Iron.**—No demand whatever, except for very small lots. Very few of the mills are running full time, while some are so close to the end of their orders that they are virtually shut down, without any probability of improvement until after the holidays. Prices are weak and irregular, but nominally as follows: Ordinary Plate,

2.15¢ @ 2.20¢; Tank, 2.20¢ @ 2.25¢; Shell, 2.6¢ @ 2.7¢; Flange, 3.5¢; Fire Box, 4¢; Steel Plates, Tank, 2.8¢; Shell, 3¢; Flange, 3.4¢; Fire-Box, 3.4¢ @ 4.5¢.

**Structural Iron.**—Mills are generally pretty well employed as yet, but new business comes in very slowly. Prospects for spring are said to be satisfactory, but in the meantime prices are not quite as firm as they were some time ago, although quoted rates are about as follows: 2.36 @ 2.4¢ for Bridge Plate; 2.3¢ @ 2.35¢ for Angles; 2.8¢ @ 2.9¢ for Tees and 3.3¢ for Beams and Channels.

**Sheet Iron.**—Business is very quiet, but not more so than usual at this season of the year. Stocks are pretty well exhausted, however, so that prices are about maintained as follows:

Best Refined, Nos. 26, 27 and 28..... 3.5¢  
Best Refined, Nos. 18 to 25..... 3.4¢  
Common, 4¢ less than the above.  
Best Bloom Sheets, Nos. 26 to 28..... 4.5¢ @ 4.6¢  
Best Bloom Sheets, Nos. 18 to 21..... 4.4¢ @ 4.5¢  
Best Bloom Sheets, Nos. 22 to 25..... 4.3¢ @ 4.4¢  
Blue Annealed..... 2.8¢ @ 3¢  
Best Bloom, Galvanized, discount..... 60¢  
Common discount..... 65¢

**Steel Rails.**—There is no business of any importance forthcoming, but manufacturers are still firm in their quotations of \$32.50 @ \$33 at mill. There will be more or less of a suspension of work within the next two or three weeks and the starting up of the mills will depend, to a great extent, on what orders are forthcoming in the meanwhile, but there is no reason to expect that prices will be lower, unless wages, fuel and other materials are reduced in proportion.

**Old Rails.**—The offerings are very light, but the demand is in proportion, hence quotations are almost nominal. Holders ask \$23 for T's in store, or \$22.50 for any small lots that may arrive, but buyers talk very little over \$21.50 @ \$22, and do not appear to want many at any price. Sales of small lots at \$22 @ 22.50.

**Scrap Iron.**—Quiet, but prices are steady, with sales in small lots at about the following quotations: Cargo lots No. 1 Scrap, \$20 @ \$21; carload lots, \$21 @ \$22, or for choice lots \$22.50 @ \$23. No. 2 do., \$14 @ \$15; Turnings, \$15 @ \$16; Old Car-Wheel, \$17.50 @ \$18; Old Steel Rails, \$20 @ \$21; Cast Scrap, \$16 @ 17; do. Borings, \$11 @ \$12; Old Fish Plates, \$27 @ \$28.

**Wrought-Iron Pipe.**—The mills are very busy, and with the exception of the usual shut-down during Christmas week will be kept steadily running during the winter months. Discounts are quoted as follows: Butt-Welded Black, 47½¢; Butt-Welded Galvanized, 37½¢; Lap-Welded Black, 60¢; Lap-Welded Galvanized, 45¢; Boiler Tubes, 52½¢.

**Nails.**—Are slow to improve, and, while outside brands are pretty generally withdrawn from the market, the uneasy feeling remains, and prices are reported as being weak and uncertain, at from \$2.05 to \$2.15 from store.

The L'esport Furnace, Leesport, Pa., so favorably known for its superior quality of Foundry Iron, went into blast last Saturday. Mr. J. J. Mohr, the Philadelphia agent, informs us that the furnace is doing well, and is likely to have a long and successful run.

## Chicago.

Office of The Iron Age, 95 and 97 Washington St., CHICAGO, December 12, 1887.

**Pig Iron.**—A satisfactory condition of trade is reported. There has been a steady demand for small lots for early delivery, with occasional purchases of 500 and 1000 ton lots for scattered deliveries next year. The large contracts which were made cover Southern Coke Iron, Ohio Softeners and Lake Superior Coke. Charcoal Iron has been rather quiet, as most of the large buyers have now placed their contracts and the furnace companies have their capacity pretty well covered for at least half of next year. With Lake Superior Charcoal Iron scarcer now than ever before known at this season, and a very decided opinion that no stocks of consequence can be accumulated during the next six months, there is a well-grounded belief among furnacemen that the latter half of 1888 can take care of itself very well. Prices have been well sustained on everything but Southern Coke Iron, on which there is an inclination toward a lower range of values, assisted by the general impression that this Iron should sell at a lower rate than Iron made from Lake Superior Ores. At the close of the week there was a perceptible increase of the bearish feeling among buyers, which had previously been rapidly passing away. The change was caused by the sudden precipitation into business circles of the tariff question, with a threatened agitation in Congress this winter, and a possibility that the subject would be continued through the Presidential campaign next summer and fall. Buyers are quick to see and use influences that may depress prices, and the tariff reduction bugbear is being pressed into service, together with other unfavorable conditions which had been worn out and cast aside, but are now being pressed into service again. The furnacemen are resisting the pressure, but some of them are inclined to blow out if it becomes too great, unless the price of Ore and Coke and the rate of freight should be reduced. We quote on a cash basis, f.o.b. Chicago: Lake Superior Charcoal, Nos. 1, 2 and 3, \$22 @ \$22.50; Alabama Car Wheel, \$27; Tennes-

see Car-Wheel, \$24.50; Southern Charcoal Foundry, \$22.50 @ \$23.50; Jackson County Softeners, No. 1, \$21.50 @ \$22; American Scotch, No. 1, \$21.75 @ \$22.25; Lake Superior Coke, All-Ore, No. 1, \$21 @ \$21.50; No. 2, \$20 @ \$20.50; Cinder Mixed, 50¢ less; Hocking Valley Coke, No. 1, \$20 @ \$21; No. 2, \$19 @ \$20; Coke Bessemer, run of furnace, \$21.50 @ \$22; Southern Coke, No. 2, \$20.50 @ \$21; No. 2½, \$19.25 @ \$19.75.

**Bar Iron.**—Orders have been rather scarce during the past week, notwithstanding the fact that some 22,000 cars are expected to be ordered from the car builders between now and the middle of January. Thus far but one specification for car-work has come into this market as a forerunner of the expected activity in this line. Dealers are buying very little, because of the approaching end of this year, but they are expected to buy largely after they have taken their usual inventory and find how low their stocks are. The majority of large purchasers seem to be influenced in their actions by the railroad companies, who are holding their orders back as long as possible. The market is irregular, some mill representatives stating that they have no difficulty in securing 1.95¢ for good Muck Bar Iron, while others name 1.85¢ as their rate on carload lots, f.o.b. Chicago. Common Iron is quoted at 1.80¢ for carload lots, but large orders could be placed at something less than this rate. Store trade is reported very fair, with prices unchanged at 2.10¢ @ 2.25¢, according to quantity and quality.

**Structural Iron.**—Very little new work is now being entered for material of this character, but the mills still have deliveries to make and their agents are kept busy in endeavoring to have their contracts hurried through. Prices are somewhat easier and they now quote Angles in carload lots, 2.30¢ at mill for first-class; Ordinary, 2.40¢, Chicago; Tees, 2.60¢; Universal Plates, 2.40¢ @ 2.45¢ at mill; Beams, 3.40¢ here in carload lots and 3.80¢ from store.

**Plates.**—Mill orders are quiet, while store business has been very good during the past week. Tank is quoted at 2.40¢ for carload lots, f.o.b. Chicago. Store prices are as follows: Heavy Sheets, Nos. 10 to 14, 2.80¢; Tank, 2.75¢; Iron or Steel Shell, 3.25¢; Flange, 4.25¢; Fire-box, 4.75¢. Boiler Tubes are firm at 52½¢ discount.

**Sheet Iron.**—Some sales of Common Black Sheets have been made at 3¢, at mill, for No. 27, but it is now between seasons, and not much trade is expected, and this price could be shaded for deliveries in January and February by mills which desire to continue in operation. Jobbers report a very fair trade, with small stocks, and prices on a basis of 3.50¢ for No. 27, with concessions of 10¢ @ 20¢ @ 100 lb, according to quantity.

**Galvanized Iron.**—The advance in Spelter and the possible advance in manufacturers' prices for Galvanized Iron have caused quite a change to come over the mind of buyers and large inquiries are now being received, with a possibility that a number of them may develop into orders. The price to the smaller trade has already been advanced to 60¢ off on Juniata and 60 and 5¢ off on Charcoal.

**Merchant Steel.**—Trade is moving along in satisfactory shape. Hardly so much is being done as was the case in November, but this is not expected, as that month was for many establishments the largest in the history of their trade. One concern here reports its November business as fully equal to that of both November and December last year. The new prices recently adopted and the new specifications are reported to be strictly adhered to in booking fresh orders. We quote store prices as follows: Bessemer Bars, 2.50¢ @ 2.60¢; Tool Steel, 8½¢ @ 9½¢; Specials, 13¢ @ 25¢; Crucible Spring, 4.50¢; Round Crucible Spring, 4.20¢; Open-Hearth Spring, 3.30¢; Open-Hearth Machinery, 2.75¢ @ 3¢; Crucible Sheet Steel, 7¢ @ 11¢.

**Steel Rails.**—A few inquiries are reported, but no sales have transpired. Quotations are firmly held at \$36 for standard sections.

**Old Rails and Wheels.**—A railroad company has sold its stock of Old Rails at \$21.50, but other holders were less fortunate, as they were obliged to take \$20.50 @ \$21. Old Car-Wheels are in demand at \$20.50 @ \$21, but sellers are not willing to meet those prices.

**Scrap Iron.**—A sale of 1000 tons of Forge is reported at \$20, but buyers are scarce. Cast is in continued demand and prices are firmer, as stocks are getting pretty well cleaned up. Some Car Axles have also changed hands during the week, but other Old Material is very quiet. We quote carefully selected Scrap as follows: ½ net ton of 2000 lb: Railroad Shop, or No. 1 Forge, \$20 @ \$21; Railroad Track, \$19; Horseshoes, \$21; Mill Iron, or No. 1 Wrought, \$15.50 @ \$16; No. 2 Wrought, Tank, Flues, &c, \$13.50 @ \$14; Light Wrought, \$10; Machinery Cast, \$15.50 @ \$16; Stove Plate, \$11 @ \$11.50; Cast Borings, \$9.75; Wrought Turnings, \$12.50 @ \$13; Coil Steel, \$13; Leaf Steel, \$15; Locomotive Tires, \$18; Axles, \$26. For Mixed Country Wrought Scrap quotations are \$12.50 @ \$13.

**Barb Wire.**—Manufacturers and jobbers have both been making good sales lately, but prices are weak. Jobbers quote 3.20¢ @ 3.25¢ for Painted, with the usual advance of ¼¢

for Galvanized, but if the upward tendency in the price of Spelter continues the difference will be made 1¢, as formerly. A call has been issued for a meeting of manufacturers to consider the situation and endeavor to make some sort of an arrangement to secure better prices. It is understood that some of them have been realizing 3¢ less at the factory for Painted. The downward tendency in Plain Wire seems to have been checked, and if it is held firmly Barb Wire ought to sympathize. Fence Staples are also firmer, prices now being 10¢ @ 100 lb higher than a week ago.

**Nails.**—The continued firmness in manufacturers' prices has, if anything, been beneficial, as numerous orders for Cut Nails have recently been booked, both in this immediate vicinity and further West. Jobbers, however, are not adhering strictly to the regular price, although they report an unusual demand for Cut Nails from the small trade. They now quote \$2.20 @ \$2.25 for Steel, in small lots, with the usual concession for carloads. In Wire Nails a large business is reported. One house has purchased 25,000 kegs, taking 15,000 from one factory and 10,000 from another. Other purchases of 5000 kegs by other houses are pending. These transactions have been made at prices lower than any previously reported, but they are regarded as indicating that the bottom has probably been touched, and as the factories involved will be out of the market for some time the representatives of other makers are inclined to take a more cheerful view of the situation. Jobbers are quoting \$3 for Wire Nails, with the usual allowance for carload lots.

**General Hardware.**—Manufacturers' agents report a continued good trade, even in Builders' Hardware, which is usually quite dull at this time of the year. Jobbers are very busy, having encountered a heavy demand for holiday goods in addition to an unusually well-sustained demand for seasonal and staple goods. Stocks are badly broken in some lines, interfering with promptness in filling orders. Indications now are that the press of business will interfere with stock taking. No changes of any moment are reported in prices, except upon articles into which the soft metals enter. All Brass Goods, Tinware, &c., have been affected by the rapid jump in the price of raw materials. Collections are still very good.

**Pig Lead.**—Sales have been made amounting to 600 tons at 5¢, for December, January and February delivery. Private sales of Common Lead were made at a shade under this, but Argentiferous is steadily held at 5¢.

**Copper.**—The demand for Copper products is light, but prices have been advanced 1 to 2¢, to correspond with the rise in Ingot.

## Coal Market.

The Anthracite Coal market is very much easier than a week ago when we first had occasion to notice the disappearance of fancy prices for "spot." With a reduced demand, supposed to be mostly due to mild weather, but which may be attributed very reasonably to an indisposition to buy at the high prices still ruling, new orders for Coal are fairly well met by the supplies now coming forward.

It is evident that consumers are not making engagements beyond immediate requirements in the expectation of more favorable terms late in the season. Operators profess to believe, however, that there is little probability of a change until it is known whether the Philadelphia and Reading Company and their employees have agreed upon a basis of wages for the year beginning January 1, as is customary at this season. The situation is explained in a few words: When the strike in the Lehigh district began September 10 the Reading Company avoided difficulty by agreeing to advance wages 8¢ above the \$2.50 minimum basis, and the miners to be given an additional advance of 33½¢ for each increase of \$1 per ton in the selling price of coal or any part thereof, beginning from September 1 and to continue four months. If at the expiration of that time (January 1) there is no settlement of the Lehigh district strike, the arrangement is to continue or a new one be amicably made. If, however, the Lehigh strike is settled, then it is agreed that the Lehigh basin will immediately go into effect in the Schuylkill region. The Philadelphia Ledger understands that, unless an advance is granted the Lehigh miners, the Reading Company is indisposed to continue paying the 8¢ advance after the date agreed upon, which expires on January 1 next. The outcome of this situation is awaited with interest.

Prominent sales agents in this city quote as follows: Stove and Chestnut, alongside, \$4.05 @ \$5; Broken, free burning, \$4.15 @ \$4.25; Reading, hard broken, \$4.50; Pea, best grade, \$3.50; Egg, free burning, \$4.40 @ \$4.50, alongside.

Bituminous is taken as fast as received at \$3.75, alongside, but there is delay in car transportation to tidewater.

The Anthracite production for last week was 594,000 tons, an increase of 54,786 tons compared with last year, and the total since January 1 is 31,897,900 tons, an increase of 2,393,884 over last year.

The New York Charity Board discussed the Coal market thoroughly, and the result is that on the 28th inst. they will give the dealers a chance to compete for 37,000 tons to be delivered at the docks of the various islands, East Twenty-sixth street pier and Bellevue Hospital; 1245 to be delivered at the city prisons, the Central Office and the reception hospital in the city, and 2000 tons, to be delivered in half-ton loads to the outdoor poor.



Metallic Key, Leather Lined.....dl\$ 55&10 @ 60&10 %

Metallic Key, Leather Lined.....dl\$ 55&10 @ 60&10 %

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# Trade Report.

## General Hardware.

The market continues in a very satisfactory condition, the demand being exceptionally good for the season, and prices, as a rule, decidedly firm. The advance in Tin, Brass, Spelter and Lead continues to influence prices of goods in which these metals are used, and a number of advances are to be noted. The fact that the prices of these metals are liable to recede sooner or later has its effect in deterring the trade from speculative purchases of goods into which they enter.

### BARB WIRE.

The New York market has been quiet and moderately active, considering the season of the year, with price still 3.75¢ for carload lots of Four-Point Galvanized Barb Wire. A meeting of the manufacturers is being held at Chicago to-day.

### NAILS.

Thus far the mild weather has been favorable to building operations, so that consumption has continued heavy at a season of the year which is usually very dull. The demand is steady and fair, and on the whole there is a slightly better feeling, which has not, however, been reflected in prices, which remain \$2 to \$2.05 from store for Iron Nails. Some of the mills in Eastern Pennsylvania have closed down.

### MISCELLANEOUS PRICES.

The following are the list prices of the Steel Rules made by the Lufkin Rule Company, Cleveland, Ohio, to which reference was made in our last issue. They are subject to a discount of 40 per cent.:

No. 31, Folding Pocket, 3/4 in. x 20 gauge, 3-in. joints, per doz.	1 ft.	2 ft.	3 ft.
No. 41, Folding Pocket, 3/4 in. x 20 gauge, 4-in. joints, per doz.	\$4.00	\$8.00	\$12.00
No. 51, Folding Pocket, 3/4 in. x 20 gauge, 4-in. joints, per doz.	\$4.00	\$7.50	\$11.00

Stitched Leather Cases for Nos. 31 and 41, 1-Foot Rules, per doz. \$1.00

No. 60, 3/4 in. x 21 gauge, without joints, per doz. \$3.25 \$5.00

No. 62, 3/4 in. x 18 gauge, without joints, per doz. \$6.00 \$10.00 \$16.00

Their Circumference Rules, No. 95, 1 1/4 inches by 18 gauge, 3 feet long, are sold at \$2, net. The following is their list on Steel Board Rules, which is subject to a discount of 33 1/2 per cent.:

No. 51, 3 1/2 ft., with Handle, Brazen Steel Head	Per doz.
No. 52, 3 ft., with Handle, same as 51 except length	\$12.00
No. 53 1/2, 3 1/2 ft., with Handle, same as 51 except length	36.00
No. 54 1/2, 3 1/2 ft., with Handle, same as 51 except length	36.00

Their Hickory Board and Log Rules are sold at discount 40 per cent., and their Perfection Glass Board at discount 20 per cent.

The jobbers, with comparatively few exceptions, have booked their orders for Steel Goods, and it is intimated that they appear to be in harmony with the association terms in regard to prices, &c., which promises well for the maintenance of the arrangements. It is thought not unlikely that in the present condition of things an advance in prices may be made. Most of the factories have booked orders sufficient to keep them busy some time, and, with the trade which comes in the spring, it is that the factories will have all that thought they can do in supplying goods.

The market for Cast Butts is decidedly firm, and with the satisfactory agreement that exists among the manufacturers it is thought not improbable that an advance will be made in the near future.

Galvanized Pump Chain has materially advanced, and the price now may be named as 6 to 6 1/4 cents per pound in less than cash lots.

The ruling prices on Scythe Snaths and Grain Cradles are regarded as low and yielding manufacturers a comparatively narrow profit. It is not, however, intimated that prices are likely to be higher in the near future.

The present condition of the market on Copper, Tin, Spelter and Lead is having its effect on the prices of goods into which these metals enter to any considerable extent, and it is regarded as certain that further advances beyond those already announced will have to be made in many other goods. Several lines have already felt the influence of the advance in the metal market, and the manufacturers of many other lines are considering the advisability of announcing advances at once, while in the meantime they are exercising such caution in the acceptance of orders, and are withdrawing quotations. Some goods, as for instance Cartridges and the Hardware line of Brass Cocks have been held at prices that afforded a broad margin of profit under previous conditions of the market, and it is a question as to whether or not the manufacturer will feel required to make advances, but in many other lines which are sold at closer figures there is no doubt that considerably increased prices will be demanded.

John H. Graham & Co., 113 Chambers street, New York, agents for E. S. Hotchkiss, Bridgeport, Conn., state that on account of the advance in Tin they are compelled to advance the price of the Hotchkiss Metallic Mouse Trap to 90 cents per dozen for five-hole Traps—the only size made. In full cases the price is 75 cents per dozen.

In their advertisement on page 8 an illustration will be found showing the special features of this Trap, for the excellence of which special claims are made.

The manufacturers of Hammers are in conference to-day, but at the time we have received no advice as to their action.

The improved condition of the Tackle Block market is referred to with satisfaction, the manufacturers generally uniting on the advanced prices to which reference was made in our last issue.

Shot is held very firmly at the recent advances, with a good demand.

Among the goods that feel the increased price of Copper, Brass Padlocks, Hand Bells, Brass and Copper Wire, Cow Bells and Rivets and Burrs may be mentioned.

The competition between the manufacturers of Wood Planes still continues very active, and prices have not improved since our last reference to them.

The market for Manila Rope, as usual at this time of the year, is weak, and prices have fallen away about 1/4 cent.

Tinware and articles into which Tin enters are advanced, and the manufacturers are showing a disposition to hold prices firmly.

An advance has been made in the price of Tinned Iron Spoons and Forks, which are held firmly at the new figures.

The Cleveland Block Company, Cleveland, Ohio, who are manufacturers, it will be remembered, of Malleable Iron Blocks, quote discount 50 per cent. on their list.

A typographical error occurred in the prices given in our last issue as announced by the manufacturers of Tackle Blocks, the discount on Thick Mortise Blocks being named as 30 and 40 per cent., instead of 30 and 10 per cent., the correct figure.

The Enterprise Reversible Float and Outlet Valves which are described on page 21, and manufactured by the Sandwich Enterprise Company, Sandwich, Ill., are listed as follows, with a discount of 35 per cent.:

3/4 inch, per dozen	\$15.00
1 inch, per dozen	18.00
1 1/4 inches, per dozen	18.00
1 3/4 inches, per dozen	24.00

We are advised that, owing to the advance in cost of metals, especially Brass, the prices of the Shells manufactured by the American Buckle and Cartridge Company, West Haven, Conn., for whom the Alford & Berkele Company, 77 Chambers street, New York, are agents, will probably be advanced early in January.

McIntosh, Huntington & Co., Cleveland, Ohio, issue a circular giving special prices on certain goods which they are thus calling to the attention of the trade.

### OBITUARY.

William Bryce, head of the firm of William Bryce & Co., 29 Chambers street, New York, died last Friday of pneumonia after a few days' illness, at his residence, 40 West Fifty-fourth street. He was born in this city in 1814, and entered the Hardware business at 14 years of age, continuing in it until his death. The firm of Wm. Bryce & Co. was founded more than half a century ago, their location then being in Pearl street, where the business was carried on until 1854, when it was removed to its present site in Chambers street. The trade of the house was originally limited to the Southern States, which have always been its principal field, but when the war broke out, cutting off business, a South American trade was secured, which has since then grown into large proportions, and the Southern business having been resumed at the close of the war the house has been doing a large and profitable trade. Mr. Bryce was for many years a familiar figure in commercial circles, and a member of the Chamber of Commerce, with which his connection dates from 1856. The tidings of his death was received with much regret, and reference is made to his strict integrity, justice, unostentatious disposition and kindness, as evinced through his long career, as explaining the esteem in which he was held. Besides giving careful and unremitting attention to the business of his firm, Mr. Bryce was also vice-president of the Phoenix Bank and a director in the Continental Fire Insurance Company, Sixth Avenue Surface Railway Company and the Atlantic Mutual Insurance Company. His funeral was attended on Monday by representatives from these companies, and many of the leading merchants in Hardware and other lines, who thus testified the esteem in which he was held and the regret which is felt for his loss.

### ITEMS.

The largest reported sale of Wire Nails was made recently in Chicago. One Hardware house bought 25,000 kegs, dividing the order between two factories, taking 15,000 kegs from one and 10,000 kegs from the other. In connection with other orders received by these factories these sales will probably absorb their full capacity for two to three months, and to that extent at least the Wire Nail market will be relieved of the competition for orders which has lately forced prices down to a wretchedly unremunerative level. The sale of 15,000 kegs in St. Louis is also reported as indicating the extent of the business in Wire Nails. These transactions are very significant.

Announcement is made by Chas. X. Cordier and W. M. Caldwell, 101 Chambers street, New York, under date December 1, of the dissolution of the firm of Whitney

Cordier & Co., New York and Winchendon, Mass., and that Chas. X. Cordier has sold his interest in the firm to W. M. Caldwell, who will hereafter continue the business in his own name, he alone being authorized to settle the accounts. In connection with this announcement it may be added that Mr. Cordier, having been connected with the Hardware business for a number of years, and having a wide acquaintance with its leading houses, we understand that he is now open for an engagement to act as representative for any of the prominent manufacturers who desire a person to represent them in any of the Hardware centers.

Porter & Wooster, Boston, Mass., call attention, in their advertisement on page 3, to their Patent Malleable-Iron Axe Wedge, an article which they refer to as having been on the market for several years, and imitated by some other manufacturers. They call the attention of the trade to the fact that this is a patented article, and warn them against infringement. The Wedge has had a large sale, so that the manufacturers have been unable to keep up with their orders.

The Joseph Dixon Crucible Company, Jersey City, N. J., issue a new circular relating to their Dixon's American Graphite Artists' Pencils, of the different numbers of which descriptions are given, as well as of the Drawing Cases in which they are offered.

The Empire Knife Company, West Winsted, Conn., are now in a position to receive orders for a new Corkscrew they have begun making, which is designated as the Empire Solid Steel Wrought Corkscrew, for the quality of which they make special claims. This Corkscrew, they advise us, is forged under the hammer from Rod Steel.

In addition to their Jail Catalogue No. 11, to which we have already referred, the Champion Iron Fence Company, Kenton, Ohio, send out sheets giving perspective views of cells and corridors, and representing some of their finest jail work, which is not shown in their catalogue.

Samuel Hall's Son, 29, 31 and 33 West Tenth street, New York, issues a list relating to the line of Screw Bolts, Nuts and Washers, Lag Screws, Bolt Ends, Tap Bolts, Set Screws and Turn Buckles of which he is manufacturer. Special attention is called to the finish of the goods, and to the fact that the threads on the Bolts and Ends are clean cut and full to fill standard gauges, so that the Nuts will interchange and fit each Bolt properly. Bolts of any desired shape or style will be furnished from 1/4 to 3 inches diameter of any length, and with Square, Hexagon, Countersunk, Round, Button, T or Bevel Heads and Square, Round, or Oval Under Heads; Wood Screws from 1/4-inch to 2-inch diameter; Turn Buckles with screw ends from 1/4 to 3 inch diameter, and Nuts for Bolts from 1/4-inch to 3 inch.

Announcement is made, New York, December 12, by Paul Thomas and S. C. Anderson, that they have formed a partnership under the firm name of Thomas & Anderson, and will hereafter continue the general agency for the United States for the Papyrograph and Papyrograph Supplies, heretofore conducted by S. C. Anderson, their address being 174 and 176 Pearl street, New York.

Charles E. Little, 59 Fulton street, New York, requests us to warn the trade against delivering goods on his account except on order written on his printed form, as a man succeeded in getting some brushes from W. P. Sherman, 269 Pearl street. He had Mr. Little's card and gave a check on the Mercantile Bank.

Sise, Gibson & Co., 100 Chambers street, New York, are sending out inquiry as to whether their catalogue of June, 1887, was received. It is explained that their apprehension that several hundred of them were destroyed is the reason for making the inquiry.

The Grand Rapids Refrigerator Company, Grand Rapids, Mich., have favored us with a copy of their catalogue for the season of 1888. It is a 32-page pamphlet, with a bright blue paper cover, the front bearing an artistic engraving of the company's name and the back a representation of their works, both printed in silver. The first seven pages are devoted to descriptions of the construction of the Leonard Refrigerators, which are exclusively manufactured by this company, and the novelties introduced this season are specially illustrated and described. The patent milk cooler, the patent canister and the special interior construction to return water from accidental leakages to the waste-pipe are dwelt upon at length. This method of interior construction was patented June 28 last. The remainder of the catalogue is devoted to illustrations and descriptions of Refrigerators of various styles, embracing single-door upright, double door upright, sideboard, buffet and mammoth for grocers and butchers, as well as Ice Chests, all made of hardwood with antique finish. The newest additions are a buffet Refrigerator of handsome design, with real bronze trimmings, beveled mirror, shelves and drawers, and a full line of sideboard backs for common Refrigerators. Porcelain-lined water coolers are used in a number of these Refrigerators. The full assortment now includes 63 distinct styles and sizes. The catalogue is printed in two colors, black ink being used for the letter-press and purple for the illustrations and borders.

Wm. H. Walbridge, a hardware salesman of long experience, formerly connected with some of the best houses in the West, has opened a manufacturers' agency at 73 Wabash avenue, Chicago. He now represents Matthews & Willard Company, W. H. Chapman & Co., Union Soap-Stone Company, Bryon Mfg. Company, Whitney, Cordier & Co., and George Mittinger, manufacturers of Lanterns, Trays, Sleigh-Bells, Foot Warmers, Wheelbarrows, Hammers, Braces, Skates, Spun Brass and Copper Goods &c. He is also agent for the sale of the XLCR Patent Cooking Crock. He sells to the jobbing trade and the largest retail houses only.

Amidon & Bastedo, Buffalo, N. Y., issue a convenient circular describing the different Braces which they are manufacturing. Their well known Corner Brace is given a prominent place.

Gurney & Co., Chicago, Ill., have been appointed Western agents for the Boston and Lockport Block Company, Boston, Mass., and Lockport, N. Y.

Cleveland Machine Company, Cleveland, Ohio, announce December 1 that the manufacture of Shear and Drop Forgings heretofore carried on by the company has been transferred to the Chicago Drop Forge and Foundry Company, at Kensington, Ill., to whom their customers are referred for the filling of further orders. A little delay in moving their forges and machinery is unavoidable, but it is hoped that by the 1st of January everything will be ready for operation. The combination is referred to as increasing the capacity of the two establishments, a large amount of new and improved machinery having been recently added to the works. F. L. Ford, the general manager of the company, and W. P. Hatch, its superintendent, will occupy the same relative positions at Kensington, and Capt. Ira Harris, the secretary of the Kensington company, will also continue in the active service of the company.

Schulte & Nehring, Evansville, Ind., issue a circular relating to their new malleable iron works and to their business as manufacturers of Malleable Iron Castings, including all kinds of Wagon, Carriage and Saddlery Trimmings and Hardware Supplies. Attention is prominently called to their special Crucible Soft Steel Castings, which are alluded to as easily welded on wrought iron or steel.

Buffalo Hammer Company, Buffalo, N. Y., whose recent additions to their factory are referred to among the Manufacturing items on page 47, intimate that next season, while keeping up the quality of their Hammers and Sledges, they will give special attention to All-Steel Full Polished Hatchets, of which they are making a full line.

Q. S. Backus, Winchendon, Mass., expects to issue a new catalogue about January 1, showing his complete line, and including some new articles of the cheaper grade.

The Chicago Tubular Well Works, Chicago, Ill., have recently made arrangements with the Tompkins Machine and Implement Company, of Dallas, Tex., to sell their machinery.

S. G. Monce, Bristol, Conn., issues a new circular describing his Novelty Glass Cutters, in which the different patterns are represented. Circle Sweeps for cutting circles, rounding ends of lights, &c., are also illustrated.

### TRADE TOPICS.

In reply to the inquiry which appeared in our issue of December 1 in regard to the price at which merchandise should be inventoried when the interest account bears the expense of the cash account, we have the following from a Pittsburgh manufacturer:

We notice in your issue of December 1 the query as to what should be done with 2 per cent. discount on interest allowed on \$100 worth of merchandise for cash in 10 days when taking stock, &c., it not being desirable to open an individual account with the party on the ledger. Answer would say: 1. We presume that interest account has been properly debited with all interest paid for loans, &c. 2. Having purchased \$100 worth of goods for \$98, cash, obtaining \$2 advance in interest, our entry would be: Mdse. \$100, to Cash \$98, Interest \$2. When stock account is taken, merchandise should be valued at its actual market value, whether more or less than \$100, which may be found by deducting the estimated expense of selling from the average selling price, or dividing total expense account by total sales per annum.

### THE CONDITION OF THE BARB WIRE TRADE IN THE WEST.

With a view to securing some information of interest to the Wire trade, a circular letter was recently addressed to the leading manufacturers of Barb Wire in the West. The interrogatories covered the changes which have taken place in the last year or two owing to the failures of Barb-Wire manufacturers and the withdrawal from business of those who wearied of its unprofitableness, the tendency of the Barb-Wire trade to pass into the control of those who draw their own Wire or have intimate relations with Plain Wire works, and in general the condition and prospects of the Barb-Wire trade. A number of manufacturers have responded to the letter, some at length and some very briefly. The responses containing facts or opinions of public interest are given herewith, but names of writers are withheld in accordance with the terms upon which the correspondence was solicited.

We have first grouped together the letters which express a decided conviction that the Barb-Wire trade is passing into the control of the Plain-Wire makers. A very prominent Illinois manufacturer says:

Numerous concerns are not doing any business, but still retain their plants, and, should prices advance so as to afford them a margin of profit they would be in shape to run again. The Barb-Wire business, so far as the small concerns engaged in it, is in such shape that they cannot pay the price for Plain Wire asked by the manufacturers for manufacturing Plain Wire and make any profit. This has closed up a considerable number of these establishments. However, as said before, they are in shape to resume operations at any time when the margins are sufficient to guarantee them in doing so. The principal increase in capacity to manufacture Barb Wire has been largely by parties interested in drawing their own Plain Wire, who have gradually increased their capacity for making Barb Wire, and the result is that, notwithstanding the suspension of minor concerns, the product of Barb Wire is fully equal to the demand, and even greater. There are no new licensed Barb-Wire concerns which have been organized in the last few years, but we hear of one or two new concerns in St. Louis who are operating outside of the patents. We think there is no question but what the trade is passing into the hands of those who draw their own Plain Wire. Still at the same time Wire can be bought at the mills at precisely the cost of drawing, and perhaps a little less. There appears to be a surplus of Plain Wire on the market, and there is no question but what the Barb-Wire business will settle down into the hands of parties who are in shape to draw their own Plain Wire, and even perhaps make their own Rods, instead of importing them, as we now do. Barb Wire to-day is sold at actual cost, counting from the ground up. Plain Wire, with the cost of barbing added and royalty at the rate of 15¢ per 100 pounds to the Washburn & Moen Mfg. Company, leaves absolutely no profit to the manufacturer, even when drawing his own Plain Wire. It is simply a question of the survival of the fittest; those whose location is advantageous, distribution favorable and whose facilities for shipping are unquestioned will survive. We believe that Barb Wire has reached the lowest possible point, and also believe that the increased demand for Barb Wire during the spring will advance prices.

Another prominent manufacturer, whose facilities for observation are among the best, writes as follows:

Barb Wire for fencing is as popular as it ever was, and is being more generally adopted; it takes less argument to sell. There is a tendency, however, for more merciful barbs, and nearly all makers are shortening their prongs. The sale of Barb Wire reached its greatest tonnage perhaps in 1884 and 1885, when a good margin for profit existed, and makers pushed their product out on long time, which, in turn, was sold on long credit to farmers. During the last two years the margins have been so small that shorter time was required, and credits have been more carefully scrutinized. This fact, together with low prices of grain, has reduced the annual sales fully 20 per cent. Upon the other hand, manufacturers of Barb Wire, who were also drawers of Wire, have finished their product largely into Barb Wire, filling up the jobbing trade at low prices, and many of them unloading surplus Barb Wire at the cost of Rods, adding only the cost of drawing and barbing. These facts have brought the business into disrepute, suspensions and failures. Of the failures Sherman & Marsh (Lyman Mfg. Company) and H. Schnabel & Co., of Chicago, are the largest, their united product being about 8000 tons per annum. Other smaller firms have failed with a total product of about 5000 tons. At least 25 per cent. of the balance of the licensees are restricting their production and only selling when they can see a slight profit, necessitating closing down and starting up as occasion requires. We know of no new firms going into business. Some manufacturers under license may have changed ownership or made arrangements with Wire drawers, who are active in seeking a market for Plain Wire. Barb Wire will no doubt ultimately go in the hands of Wire drawers, who are at present confined in their sales to 15 to 30 licensees, whose margins for profit in turn are so small that the credit is hazardous, and these mills must and will have a chance to choose their line of credits.

One manufacturer confines his answer strictly to the influence Plain-Wire drawers are able to wield in the Barb-Wire trade in the following paragraph: "We know that the Washburn & Moen Mfg. Company have steadily refused to grant tonnage to drawers of Wire, and it seems to us that this was simply justice on their part, not to give by any act of theirs the privilege to drawers to manufacturers and sell Barb Wire, thereby giving them the power to ruin manufacturers who had bought tonnage. There is no question but that a Wire drawer could place Wire with the trade so as to rule out those manufacturers who do not draw their own Wire."

A manufacturer of Barb Wire who also manufactures a large line of other goods gives his opinion of the present condition of trade as follows:

We have practically been out of the Wire business for over a year now, and have not, in consequence, kept trace of the condition of affairs throughout the country as closely as would have been the case otherwise. We have not been running our machines on account of there not being sufficient profit in the business to warrant us in doing so. We are not able to determine to what extent the restriction of production has been counterbalanced by the increased output of large works, but think that it has been nearly equal. In our opinion, the trade is rapidly passing into the hands of firms who draw their own Wire, or have intimate relations with Wire-drawing mills. In fact, we formed



# Trade Report.

this conclusion some years since, and the tendency of the trade seems to warrant the inference. We have never been interested to any great extent in the trade, as it was simply a side issue with us, and whenever the market became unsatisfactory in regard to price we discontinued running our machines and devoted our efforts to our own general line.

A brief but pungent answer comes as follows from a manufacturer outside of Illinois: "The margin of profit on Barb Wire has for a long time been so close that in our judgment at least one-half of the original licensees have either failed or turned their plants into some other line of manufacture. The business is going into the hands of the Wire mills."

A large manufacturer in Missouri writes briefly but positively as follows:

In reply to your first question would say we know of but three Barb-Wire companies who have discontinued business, two of them being in Chicago and one in Joliet. We do not know that any factories are now temporarily closed. We are not aware that there is any restriction placed upon any manufacturers of Barb Wire. Such an arrangement was contemplated at one time, but never carried into effect. We know of but one new enterprise started during the past year, and that is the Continental Barb Wire Company, St. Louis. The larger Barb-Wire manufacturers now either draw their own Plain Wire or have intimate relations with some Plain Wire mill.

The remaining letters do not take the same view of the course of the Barb-Wire trade, but their writers believe that circumstances will enable those who have to purchase their Wire to survive. The first one is from a manufacturer some distance west of Illinois, who says:

We are not aware of any changes in the past year that will materially reduce the production of Barb Wire. A very few of the smaller concerns may have withdrawn from the business; I think, however, more particularly for the want of capital than profit. Although the profits are very light to all manufacturers, we are not aware of any failures in the Barb Wire business, except what have occurred in or near Chicago. Most manufacturers are closed at this season of the year. We do not now think of any new concerns going into the business, but we are enlarging our capacity. In our judgment the trade will not entirely pass into the hands of Wire drawers, as they are now selling Plain Wire, many of them, at less than the cost of production. To add Barb-Wire machinery might assist them in unloading their goods, but the increased production would reduce market prices that the evils arising from this direction would more than overcome the benefits. We think that manufacturers of first-class goods are getting a profit, while those making an inferior article are not making money, and must in time give place to the better grade of goods.

An Ohio manufacturer gives his views somewhat at length, as follows:

We are not aware of any companies closing their works on account of the low prices or unprofitableness, except in Joliet or near vicinity, of one or two small concerns, and, in these cases, it has been where they had no capital and no means of credit for buying the raw material. We do not think that any establishments have discontinued or are now closed where they have the means or can purchase the desired Wire for barbing. The restriction of production by failures has not affected the condition of the trade. Some works have increased their capacity somewhat, but none of them to a large extent, except one concern at Allentown, Pa., and one factory in Cleveland. The capacity of production is fully equal to the demand. We are not aware of any new works being started. We do not think that the trade is passing into the control of Plain Wire mills. It has always been run quite largely by Plain Wire works, or those having intimate relations with such works. Some Barb-Wire companies have within a year or two added to their business facilities for drawing Plain Wire, but, as we believe, have received no advantages by doing so.

The following cheerful letter comes from an Illinois manufacturer:

Last year, and thus far this year, our trade has been excellent, never better. We do not find the trade passing into the hands of Wire drawers. It may be possible that as new locations are selected for manufacturing Barb Wire it will compel Wire drawers to seek them, for the Wire trade has a Westward tendency, and freights will determine location, other things being equal. There is every reason to believe the Wire trade to be in splendid condition. Of course prices are low and margins narrow, and if some one will only put forward a plan to increase the width of this margin we will feel like Tennyson's brook:

"For men may come and men may go,  
But we'll go on forever."

Otherwise will quit when our time comes.

And here is another cheerful letter from a manufacturer in the Northwest, who buys all his wire: "So far as our own business is concerned, we have had a prosperous year. We are one of the small concerns, and can only answer for ourselves. We are not intending to close up."

The last letter in this series is from a manufacturer whose works are located in Illinois, and who has decided opinions on the subjects which he discusses. It is as follows:

We think if the large Wire mills take to barbing their product they will have to charge a legitimate profit on barbing as well as upon drawing their Wire, something to pay them for the additional capital used, risk incurred and bad debts made in selling the Barb Wire. We think some of the

larger manufacturers of Barb Wire who have begun drawing Plain Wire have sold their Fence Wire without profit on the barbing in order to freeze out smaller manufacturers who bought their Plain Wire and depended entirely upon the barbing. The impression has seemed to prevail among certain big (headed) manufacturers that they could crowd out the smaller fellows. They have overlooked the fact that a man with an output of only 500 tons has but a small load to carry, that he can shut down as soon as there is no profit and wait for better times. They do not seem to see that the man with only 100 tons of Fence Wire piled up can make quotations as low as anyone and may establish a market for 100,000 tons to be sold by them. Perhaps their freezing out process may have caused the small man to realize at a ruinous loss, and so put the market at a loss for themselves. It is alleged that the country is now forced up and the future demand will be very light. The fact is that the fences first built are already being removed. Fence will not last forever. Ranches will be divided into farms and fenced up. In the early history of the barb fence business there was a large profit; any man could make money in it. Men without business capacity, and unprincipled enough to be willing to use Washburn & Moen's patents without compensation, went into the business. The trade has since suffered from their bad management and their distrust and suspicion of one another, destroying all confidence, and placing manufacturers at the mercy of buyers. What is wanted is a little more common sense, a good deal more confidence in each other, a co-operation between large manufacturers with the smaller ones, instead of crowding them; the same also with the Plain Wire mills. There is a large capital invested—Fence Wire of better quality than ever is now being made—the cost of making has been and is being daily reduced, weak and dishonest men are going to the wall. On the other hand, the country needs Barb Wire; it is a great staple and will be sold in large quantities and at fair profit. The fence business is going to continue to be one of the large interests of the country.

We shall be glad to have the views of other Barb Wire manufacturers on points suggested by the above communications, or with relation to other questions which seem of sufficient importance to the trade to be discussed in our columns.

## COPPER.

The following advanced prices on Manufactured Copper were adopted by the manufacturers December 9:

### Sheet and Bolt Copper.

Sizes of sheets.	Per square foot.									
	64 oz. and over.	32 oz. up to 64 oz.	16 oz. up to 32 oz.	8 oz. up to 16 oz.	4 oz. up to 8 oz.	2 oz. up to 4 oz.	1 oz. up to 2 oz.	1/2 oz. up to 1 oz.	3/4 oz. up to 1 1/2 oz.	Lighter than 3/4 oz.
Not wider than 30 in. & not longer than 72 in.	25	25	25	26	27	28	31	33		
Not wider than 30 in. & longer than 72 in.	25	25	25	26	28	30	34			
Not wider than 30 in. & not longer than 96 in.	25	25	25	27	29	33	36			
Not wider than 30 in. & longer than 96 in.	25	25	26	28	30	34	38			
Not wider than 48 in. & not longer than 96 in.	25	25	27	29	31	35				
Not wider than 48 in. & longer than 96 in.	25	25	28	30	32	36				
Not wider than 60 in. & not longer than 96 in.	25	25	30	32	37					
Not wider than 60 in. & longer than 96 in.	25	25	31							
Not wider than 84 in. & not longer than 96 in.	26	27								
Not wider than 84 in. & longer than 96 in.	27	28								
Over 84 in. wide	28	30								

All Bath Tub Sheets, 16 oz. 14 oz. 12 oz. 10 oz. Per pound, \$0.28 0.31 0.32 0.35  
Bolt Copper, 3/4 inch diameter and over, per pound, 25¢  
Circles, 30 inches in diameter and less, 3 cents per pound advance over lowest prices of Sheet Copper of the same thickness.  
Circles over 30 inches diameter, up to 96 inches diameter inclusive, 5 cents per pound advance over lowest prices of Sheet Copper of the same thickness.  
Circles over 96 inches diameter, 6 cents per pound advance over lowest prices of Sheet Copper of the same thickness.  
Segment and Pattern Sheets, 3 cents per pound advance over price of sheets required to cut them from.  
Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, 1 cent per pound over the foregoing prices.  
Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, 2 cents per pound over the foregoing prices.

## Tinning.

Tinning Sheets on one side, 10, 12 and 14 x 48, each, 8¢  
Tinning Sheets on one side, 30 x 60, each, 30¢  
For Tinning Boiler Sizes, 9 inches, 14 x 50, each, 15¢  
For Tinning Boiler Sizes, 8 inches, 14 x 50, each, 12¢  
For Tinning Boiler Sizes, 7 inches, 14 x 52, each, 12¢  
Tinning Sheets on one side, other sizes, per square foot, 2¢  
For Tinning both sides, double the above prices.

## Planished Copper.

14 and 16 ounce and heavier, Per pound, 34¢  
By the case, 33¢  
12 ounce and lighter, 37¢  
By the case, 36¢  
Boiler sizes, 7 inch, 14 x 52; 8 inch, 14 x 50; 9 inch, 14 x 60, 38¢  
14 and 16 ounce and heavier, 36¢  
By the case, 35¢  
(And all sizes not over 30 inches wide.)  
24 x 48 and 30 x 60, 38¢  
14 and 16 ounce and heavier, 41¢  
12 ounce, 41¢

## Planished Brass.

Same price as Planished Copper.  
Tinning.  
14 x 48, by the case, Per sheet, 12¢  
Boiler sizes, 7 and 9 inch, Per sheet, 38¢  
Other sizes not larger than 30 x 60, 38¢  
Per square foot, 2¢  
14 x 48, less than case, Per sheet, 10¢  
Boiler sizes, 9 inch, Per sheet, 15¢  
Larger than 30 x 60, Per square foot, 5¢

## Copper Bottoms, Fits and Flats.

14 ounce to square foot and heavier, Per pound, 34¢  
12 ounce and up to 14 ounce to square foot, 36¢  
10 ounce and up to 12 ounce, 38¢  
Circles less than 8 inches diameter 2 cents per pound additional.

## STATE OF TRADE.

The following advices received from Hardware houses in different parts of the country will be of interest, as giving information as to existing conditions of business, and the views of intelligent merchants as to the outlook in the several sections to which they relate:

### Dakota.

BUFFALO GAP.—We are still suffering from the reaction which naturally follows the abnormal growth of nearly all the towns in this section on the completion of our first railroad. Until the fall of 1885 our nearest railroad point was at the Missouri River, 200 miles east, to which an unclassified rate of 75 cents per hundred from Chicago was made for Black Hills business, in addition to which it cost from \$1.75 to \$4 per hundred for wagon transportation, depending largely on the condition of the roads. From November to June it was almost out of the question to haul freight, making it necessary to ship a six months' stock in the fall. Very large stocks had to be carried, but as few consumers did or could ship their own supplies, the dealer had a monopoly. Competition not being very strong, everybody made money, 25 to 50 per cent. being the usual profit on staples, and 50 to 300 per cent. on shelf goods. Still we were not satisfied. Forty thousand people were isolated from the rest of the world by the great Sioux Indian reservation on the east, and the vast cattle ranges of the Northwest stretching west to the Rocky Mountains. From the first settlement of the hills in 1876 until the C. and N. W. R. R. built in 1885 there was a constant and unanimous cry for railroad communication with the outside world. For with their advent it was expected that an era of prosperity would begin, as lower freight rates and increased facilities would stimulate a development of low grade mines, and fill the country with immigrants, in which we have to a large extent been disappointed so far.

In the first place, all figured on an unusual demand for all classes of merchandise and everybody established in business bought heavy stocks of goods, while hundreds of Eastern men followed the railroad in to compete for the immense trade said to be here. As a result new towns sprang up and hundreds of new houses began business. More goods were shipped in six months than could be sold in two years. Of course this excessive competition cut prices and divided trade until very few people made any money. Then the railroad charged exorbitant rates—\$1.50 to \$2.75 from Chicago on everything that could not be produced here, while on all of the products of the country a very low rate was made, enabling grain, flour and lumber to be shipped in, to the detriment of the ranches, millers and sawmill men, who were able to nearly supply the local demand. A great many immigrants did come in, but it took about all they had to get here, and they cannot buy much until they grow a crop or two.

However, I am satisfied that the bottom has been reached, and, in my judgment, the future outlook is very encouraging, as the large crop of this season has put the ranchers in better shape than they have been before in a long time, while the constantly increasing output of the gold and silver mines, amounting to nearly \$5,000,000 annually, and the regularity with which the best properties are declaring dividends, is rapidly putting our mining industry on a solid substantial basis, with but little of the speculative wildcat operations that have characterized mining matters during the early history of this country. Our extensive tin interests have been developed but very little yet, but increased activity is being manifested in that direction, and by spring extensive operations will undoubtedly be inaugurated. The Tin Mountain Company, of Chicago, are now erecting reduction works on a valuable property recently purchased by them near Custer, while a syndicate of New York and London capitalists have bonded the most promising locations in the hills, and will probably soon effect a purchase of sufficient property to warrant them in beginning work on a large scale. Several marble and stone quarries are being opened at Buffalo Gap, while extensive coal fields are being developed on Hay Creek. With the advent of at least one more road during the coming season the discriminations against us in freights will be equalized and adjusted by competition.

The excessive overstocks carried by nearly everybody during the past two years have been worked down to the legitimate demand of the country. Over half of the Eastern men who came in with the railroad have been frozen out, leaving the trade in a good healthy condition, and when prosperous times come again, as they surely must in the spring, everybody will be ready to profit by the expensive lesson learned during the last boom.

ABERDEEN.—Trade at the present time is all that we can ask for, and the prospect for the next seven weeks is very flattering. The large crop this fall in Central Dakota and the price of wheat (which has averaged from 3 to 5 cents over the market) have enabled our best farmers to pay their debts and get out of the hands of our so-called banks, which are simply shave shops, getting from 3 to 5 per cent. for money per month, and with not enough money to accommodate even our gilt-edged paper handled by our wholesale merchants here. We need a bank of \$150,000 capital, which would be profitable and valuable from the start. Our February trade is always light, and we do not expect that it will be otherwise the coming year. However, we always have early spring trade, that of March being particularly good.

SCOTLAND.—We have been doing exceedingly well. The corn and hog crop has been very good and prices satisfactory. Being our chief crop it helped to move business considerably. Builders' Hardware has had an unexpected demand, it being generally out of season with us at this time of the year. We expect trade to slacken up

around New Year's for about a month, when our farmers commence to sell fat cattle, and, as a considerable number of cattle are being fed and prospect of good prices in view, we do not see why our trade should not be just as good as ever.

### Nebraska.

BEATRICE.—While the volume of business is perhaps not quite so large in this section as in some former years, I consider it to be in an exceptionally healthy condition. There is, I think, a growing caution and conservatism on the part of merchants in Nebraska, both in buying and selling. The tendency is to cut off the credit business as much as possible, and the result of these improving methods will be that there will be fewer failures to record. Locally here there is a growing improvement in farming interests. Prices of corn, hogs and cattle, which are our staples, have materially advanced, and farm property, which has been unsaleable for the past two or three years, is looking up. Sales of farms and farm lands are becoming quite frequent and prices of same are advancing, showing a growing confidence in that basis of all industries. I look for a better than usual winter trade and for a good and early opening in the spring, and I think that all the conditions here at this time justify this expectation.

GORDON.—We are having nice winter weather and trade is keeping up very well. The only thing we lack is a good market, but our prospects are better for next year, as the oil and coal fields are opening up and we are about as close to them as any one.

### Texas.

HOUSTON.—The condition of business at the present time we consider good, and our trade is a little better than last year at this time. During the latter part of last month a strike of the switchmen on all the railroads in the city interfered seriously with business, especially the grocery trade and perishable goods, but we, too, felt it. The prospects for the winter trade are fair and we expect a very good trade in Plows.

CALVERT.—The prospect for business is not good with us by any means, as the farming interests have made very short crops and will have no money to spend until another crop is made.

SAN ANTONIO.—Trade is very quiet and has been for months, but we think we will have much better times in the next six or eight months. We are having a very calm winter, with fair rains, which we have not had in two years. Grass is healthy, growing finely. Stock in good order, but a very slow sale. Good prospect of sales in a very short time, however. If parties would come to our market during this month and month of January, 1888, we have no doubt that they could buy year-old stock at \$4.75, and two years olds at \$6.75 to \$7, while our regular price should be from \$9 to \$13. Wool we have had a good six months' clip, but it is selling at from 12 1/2 cents to 16 1/2 cents, and six months' clip before this in early part of the year brought from 18 cents to 24 cents per pound. Still, on account of rains we are having we expect to have a good farm crop this coming season, and that business will be much better by about September, 1888. We have not made more than our expenses for 18 months.

## Pittsburgh.

Office of The Iron Age, 77 Fourth Avenue, Pittsburgh, Pa., December 15, 1887.

There has been no marked change in the general iron situation since our last report. Trade, both in the raw material and product, is less active as compared with September and October, but this must be expected in the last month of the year. River navigation is not yet fully resumed; some of the packets have started up, but there is not water enough for coal shipments. There are about 10,000,000 bushels of coal ready to move, some of which has been loaded five months.

Pig Iron.—The general position of the market remains the same. The President's message is generally regarded as a free-trade document, the effect of which is not very inspiring, but the belief is pretty general that Congress will not meddle with the tariff present session, and there is reason to believe that business will improve early in the new year, or as soon as the work of stock-taking has been completed. Another cause, and it is a good one, for the comparatively light business is the recent decline in price; buyers always hold off on a declining market. Sales during the week show a further decline; city brands of Gray Forge sold during the week under review at \$17, four months', and other makes at \$16.50, four months. While there have been no sales of Bessemer reported under \$19, cash, it is intimated that it can be had at \$18.50, cash. Some furnacemen say that unless there is a change for the better soon they will blow out. Quotations for the different grades may be fairly made as follow:

Neutral Gray Forge,.....	\$16.50 @ \$17.25 4 mos.
All Ore Mill,.....	15.00 @ 15.50 "
White and Mottled,.....	15.50 @ 17.00 "
Silvery Iron,.....	19.00 @ 20.00 "
No. 1 Foundry,.....	20.00 @ 20.25 "
No. 2 Foundry,.....	19.00 @ 19.50 "
No. 1 All-Ore Foundry,.....	20.50 @ 20.75 "
Charcoal Foundry,.....	24.00 @ 25.00 "
Cold Blast Charcoal,.....	27.00 @ 30.00 "
Bessemer Iron,.....	19.50 @ "

Muck Bar.—Continues dull, and prices are weak, in sympathy with Pig Iron; we now quote at \$29 @ \$29.50, cash, for the ordinary Muck, and there is no difficulty in buying such at the prices quoted. Some country mills are making for so much a ton, the buyer furnishing the Pig Iron delivered at the mill of the maker. There has been a decline of \$3 @ \$3.50 per ton within a few months.

Manufactured Iron.—Business continues rather light. Manufacturers do not expect much new business during the last half of December or the first half of January. However, some of them still have all they

can do working up old contracts. There is reason to believe, however, that business will pick up early in the new year, and the indications now are that the requirements of 1888 will be equal to those of 1887. Prices are easier, in sympathy with the raw article.

Nails.—There is no improvement to note in the Nail trade, and not likely to be until toward spring; manufacturers do not expect much from December until March, and it is not likely that they will be surprised. This has been one of the poorest years the Nail makers have had for a number of years, as, in addition to a very light demand, there was little or no margin for profit. So poor has the business become that some of our manufacturers have about abandoned it, and the Wheeling manufacturers have little, if any, advantage over those of Pittsburgh. The cost of Steel Nail Slabs has declined \$2.50 @ \$3 per ton within the past couple of months, which places the Nail manufacturer in a better position in that respect, though there is really no demand for Nails. We continue to quote at \$1.90 @ \$2, 60 days, 2 % off for cash.

Wrought Iron Pipe.—There was a special meeting of the Wrought Iron Pipe Association in this city last Thursday in regard mainly to freight rates; there was nothing done of any interest to the general public. Business continues to fall, and there is not likely to be much change for the better until the spring trade opens up. Some of the mills are still pretty well employed in working up former contracts. Prices remain unchanged. Discount on Black Butt-Welded Pipe, 47 1/2 %; on Galvanized ditto, 37 1/2 %; on Black Lap-Welded, 60 %; on Galvanized, 45 %; Boiler Tubes, 52 1/2 % off; Casing, all sizes, 50 % off; 2-inch Tubing, 14¢ per foot net; 2-inch Line Pipe, 13¢; 8-inch Line Pipe, \$1.40.

Billets, &c.—Bessemer Steel Billets appear to have touched bottom at \$29 @ \$30. Sales reported during the week at prices quoted, according to quality, size and delivery. The last sale of Nail Slabs was at \$29, which appears to be hard pan. Sales of domestic Rail Crops at \$19.50 @ \$19.75 and Bloom Ends at \$19 @ \$19.25. There have been no sales of foreign Steel in this market for some time, as it cannot be sold in competition with domestic. Domestic Billets can be bought here for about what they are held for at the seaboard. At this time last year sales of foreign Billets were quite numerous here.

Old Rails.—Business continues dull, as is to be expected just at the close of the year; consumers generally are buying sparingly, only as their immediate wants require. We are advised of a sale of 2000 tons foreign Tees at \$24.

Steel Rails.—We hear of occasional small sales for immediate delivery, but beyond this there is nothing doing here—at least there is nothing reported. Orders for delivery next year may have been taken, but if so it is kept quiet. An increased business is looked for next month. Some of the railroads are still holding back in expectation of lower prices.

Railway Track Supplies.—Continues dull, as is nearly always the case during the winter season; prices remain unchanged: Spikes, 2 60¢, 30 days, delivered. Splice Bars, 2¢ @ 2.10¢; Track Bolts, 3.10¢ with Square and 3.20¢ with Hexagon Nuts.

Old Material.—There is no improvement in demand and no change in prices. No. 1 Wrought Scrap, \$20 @ \$21, net; Wrought Turnings, \$13.50 @ \$14.50; Car Axles, \$27 @ \$28; Cast Scrap, \$16.50 @ \$17, gross; Cast Borings \$12 @ \$13, gross; Car Wheels, \$19.50 @ \$20, gross; Open-Heart Steel, mixed lots, \$20, gross.

Charles Himrod & Co., 115 Dearborn street, Chicago, are undertaking an important project, which is full of interest to those who use, make and sell foundry pig iron. They have employed a chemist to make the proper analyses for them, and they propose to furnish iron of guaranteed contents to any of their customers who desire to make experiments on a basis of the chemical contents of pig iron. In a circular letter to their customers they say: "If you will find out what percentages of phosphorus, carbon, sulphur, manganese and silicon give you the best results, we will furnish you an iron guaranteed to contain specified quantities of these substances. There is probably no place in the world where such variety of iron ores are found as in the Lake Superior district. Ores can be had containing from almost no phosphorus to enough to produce pig iron containing 1 per cent; with no manganese at all to 15 per cent; with silicon from a bare trace to 15 or 20 per cent, so that, with a proper selection of ores and proper manipulation in the furnace, any desired combination of these substances can be obtained in the pig iron. We expect to be able to furnish you a pig iron containing any quantity of phosphorus desired up to 1 per cent, with any quantity of manganese up to 2 per cent, with any quantity of silicon up to 10 per cent, and with the carbon as desired." In connection with the circular they inclose a printed copy of certain papers, read before the British Iron and Steel Institute, relating to the effect which different elements have upon foundry pig iron. They intend to preserve the results which they secure from the experiments which may be undertaken by their customers, believing that facts of great value will be ascertained, based upon practical tests made with exact scientific knowledge.

Voluntary subscriptions have been made in Japan to the amount of \$2,000,000 for the coast defense fund. About \$600,000 will be applied to the manufacture of cannon in the national foundries.



**L. COES'**  
GENUINE IMPROVED  
**Knife Handle**  
PATENT  
**Screw Wrenches**  
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ESTABLISHED IN 1830.




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Our Eureka Patent Flexible Back Saws, the teeth of which are hard, the back being soft, thereby preventing them from breaking in two, have been greatly improved and are giving the best satisfaction. Our Crescent brand of Hack Saws are hardened all through with uniform temper, and are the best Hack Saws so tempered.

We are now preparing to supply the wants of the trade according to their preference. Hardware Dealers run no risk by buying from us either our Eureka or Crescent brand of Hack Saws on our recommendation, as we give them the option of returning the first lot to us at our own expense any time within three months from date of invoice. Correspondence solicited.

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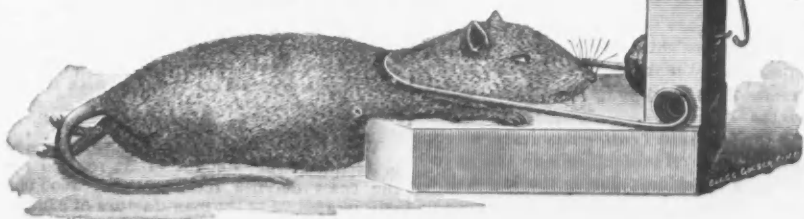
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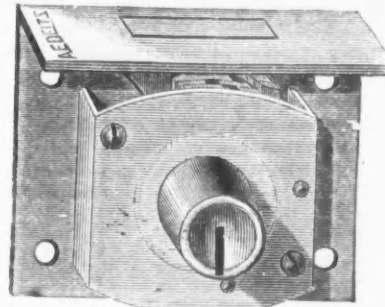
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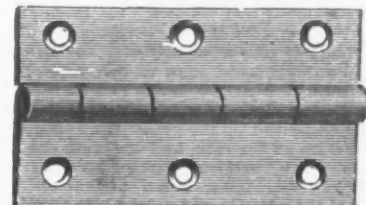
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Fully Warranted. Has Patent Adhesive Rolls.  
Best Steel Springs, Malleable Iron Crank.  
Send for fully illustrated Catalogue and Price List of thirty different styles and sizes of Wringers.  
**BAILEY WRINGING MACHINE CO.**  
WOONSOCKET, R. I.

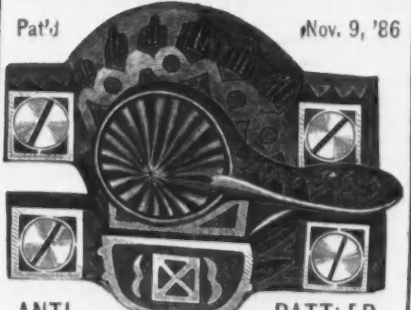


The Reiher Improved  
"CHAMPION"  
Self-Locking  
**TRANSOM LIFTER.**

A represents the stationary guiding and locking bar rod C, B forms with arm E and bracket F connection with transom. D is the adjustable guide which holds operating rod to the door casing. Handle G in combination with parts A and C forms a novel locking device and will hold the transom in any desired position. We also manufacture several other devices. Send for catalogue and price list.

F. A. REIHER,  
Manufacturer,  
11-13 S. Canal St., Chicago.

### Security Sash Lock.



ANTI-RATTLER.  
The Claffen Mfg. Co.,  
Cleveland, Ohio, U. S. A., Sole Manufacturers

A SMALL SPACE  
Occupied by the  
**EMPIRE DRYING BAR**  
Which has large capacity and folds up out of the way. Sells readily. Large profits made. Address  
**Empire W. CO. Auburn, N. Y.**

TUB WRINGERS, BENCH WRINGERS

—AND OTHER—  
House-Furnishing Specialties.

CATALOGUE FREE.

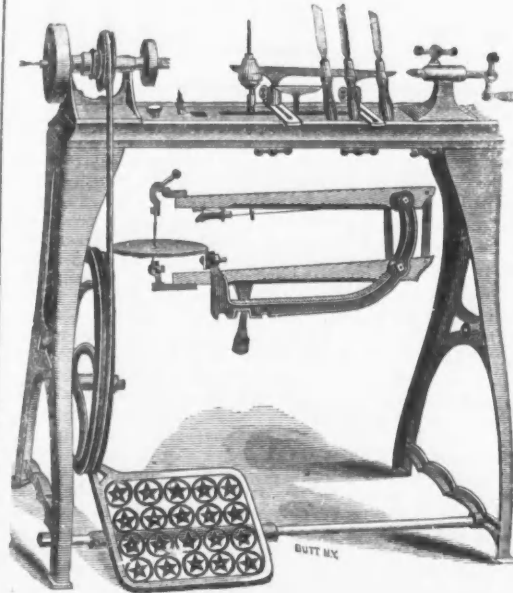
THE BEST AND CHEAPEST

## WIRE NAIL

MACHINE,

Tack and Nail Machinery.

WM. A. SWEETSER, Brockton, Mass (39 Montello Street).



Many kinds of Scroll Saws have been put on the market by ourselves and other manufacturers during the past twelve years. Of these only a few have proved good enough to remain in demand. The call now is for a well-made, practical machine, and all second-class ones are of slow sale.

Those who want a good Lathe with Scroll-Sawing Attachment and all Tools and Improvements to the very latest moment will buy the Goodsell Lathe.

Those who want only a Scroll Saw with Drilling Attachment, Rubber Blower and Lever Clamp will prefer the Rogers saw.

These two machines are taking the place of all others, and are now the most in demand throughout the world.

No dealer can make a mistake by laying in a stock of them. About Christmas time they are wanted in every town, and will make business lively at this otherwise dull season.

We also keep a full stock of Designs, Wood, and all other Scroll Sawing goods.

Price of Goodsell Lathe, complete, \$12.00.

Price of Rogers' Saw complete, \$3.50.

## MILLERS FALLS CO.,

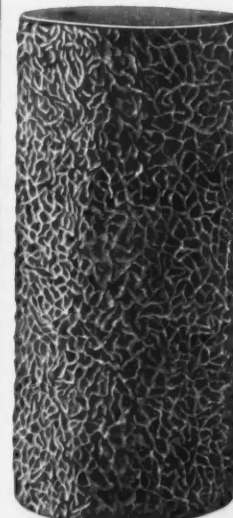
93 READE STREET, NEW YORK.

**CHAMPLAIN**  
Forged Horse Nails.  
MANUFACTURED BY THE  
**NATIONAL HORSE NAIL CO.,**  
Vergennes, Vermont.  
HOT FORGED AND COLD HAMMERED POINTED. MADE OF BEST NORWAY IRON AND WARRANTED.

WAREHOUSE  
97 CHAMBERS AND 81 READE STREETS NEW YORK.  
J. C. McCARTY & CO. Sole Agents.

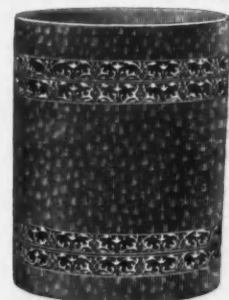
### CHRISTMAS NOVELTIES.

## Umbrella Stands, Waste Paper Jars



Seamless. No Metal to Tarnish.  
Will not break if Tipped Over.

Decorated or Plain,  
For Home Decoration.



"Pa-Crusta" Umbrella Stand.

Waste Paper Jar.

"Full Finish" Umbrella Stand.

Sold by all First-Class Dealers in Crockery, Housefurnishing Goods, Stationery, &c.

## Union Indurated Fibre Co.,

110 Chambers St., New York. 39 Wabash Ave., Chicago.

PORTLAND, ME.  
WATERTOWN, MASS.

MECHANICSVILLE, N. Y.  
OSWEGO, N. Y.  
SKOWHEGAN, ME.

LOCKPORT, N. Y.  
WINONA, MINN.

Double Acting Spring **BUTTS** SABIN'S LEVER DOOR SPRINGS  
Coil, and Sabin's Volute Springs  
For various purposes made to order.

WALPOLE

MILLS.

## EMERY

SOUTH WALPOLE, MASS.



Ex Congressman Charles L. Mitchell, New Haven, has nearly completed arrangements to organize a new company and take up the business of the suspended firm of Mitchell, Vance & Co., the manufacturers of gas fixtures and brasswork, who are now in the hands of Receiver Gilroy. He proposes a cash capital of at least \$125,000, and to settle with creditors with cash and notes secured by mortgage.



## Paints, Oils, &amp;c.

## Paints.

Black, Lamp—Coach Painters'.....	12 @ 24	246
Ordinary.....	12 @ 15	180
Black, Ivory Drop, fair.....	12 @ 25	300
Black, Ivory Drop, best.....	12 @ 30	360
Black Paint, in oil, kegs, 87; assorted cans, 116		
Blue, Prussian, fair to best.....	40 @ 55	2,200
Chinese dry.....	45 @ 55	2,475
Ultramarine.....	18 @ 30	540
Brown, Spanish.....	13 @ 15	195
Van Dyke.....	10 @ 12	120
Dryers, Patent American, ass'd cans, 96		
Green, Chrome.....	15 @ 25	375
Green, Chrome in oil.....	14 @ 18	252
Green, Paris.....	10 @ 20	200
Green, Paris in oil.....	10 @ 20	200
Iron Paint, Bright Red.....	10 @ 12	120
Iron Paint, Brown.....	10 @ 12	120
Iron Paint, Purple.....	10 @ 12	120
Iron Paint, Ground in oil, Bright Red.....	10 @ 12	120
Iron Paint, Ground in oil, Red.....	10 @ 12	120
Iron Paint, Gr. and in oil, Brown.....	10 @ 12	120
Iron Paint, Ground, Purple.....	10 @ 12	120
Litharge.....	10 @ 12	120
Mineral Paints.....	10 @ 12	120
Orange Mineral.....	10 @ 12	120
Red Lead, American.....	10 @ 12	120
Red Venetian (Eng.) dry.....	10 @ 12	120
Red Venetian in oil.....	10 @ 12	120
Red Indian Dry.....	10 @ 12	120
Rose Pink.....	10 @ 12	120
Sienna, American Raw, powdered.....	10 @ 12	120
Sienna, Burnt, powdered.....	10 @ 12	120
Sienna, Burnt, in oil.....	10 @ 12	120
Sienna, Raw.....	10 @ 12	120
Umber, Burnt, powdered.....	10 @ 12	120
Umber, Burnt, in oil.....	10 @ 12	120
Umber, Raw, powdered.....	10 @ 12	120
Umber, Raw, in oil.....	10 @ 12	120
Vermillion, Chinese.....	10 @ 12	120
Vermillion, English.....	10 @ 12	120
Vermillion, American Common.....	10 @ 12	120
White Lead, American pure dry.....	10 @ 12	120
White Lead, American pure dry, in oil.....	10 @ 12	120
White Lead, English Prime.....	10 @ 12	120
Yellow Ochre, French.....	10 @ 12	120
Yellow Ochre, French, in oil.....	10 @ 12	120
Yellow Ochre, Vermont.....	10 @ 12	120
Yellow Chrome, in oil.....	10 @ 12	120
Zinc White, American No. 1, dry.....	10 @ 12	120
Zinc White, American No. 1, in oil.....	10 @ 12	120
Zinc White, French (Paris Dry).....	10 @ 12	120
Zinc White, French, in oil.....	10 @ 12	120

## Oils.

Bleached Whale, 1/2 gal.....	41 @ 44	1,804
Bleached Sperm, 1/2 gal.....	67 @ 75	5,025
Fish Oil, Pressed.....	26 @ 27	702
Lard, Prime Winter.....	61 1/2 @ 62 1/2	3,844
Cylinder Oil.....	70 @ 70	4,900
Machinery.....	55 @ 55	3,025
Engine.....	55 @ 55	3,025
Linseed, Raw, in casks and bbls.....	61 1/2 @ 61 1/2	3,844
Linseed, Boiled, in casks and bbls.....	54 @ 54	3,222
Neatsfoot.....	45 @ 70	3,150
Cotton Seed, Refined.....	41 @ 48	1,968

## Sundries.

Asphaltum, Cuban.....	5 1/2 @ 0 3/4	4,125
Asphaltum, Egyptian.....	5 1/2 @ 0 3/4	4,125
Benzine, 60°.....	9 1/2 @ 9 1/2	8,775
Coal Tar.....	100 @ 100	10,000
Chalk, Block.....	45 @ 45	2,025
Crucibles No. 14 upward.....	10 @ 10	1,000
Grain Emery, 300 B kegs.....	4 @ 4 1/2	18,000
Flour Emery, finest quality.....	2 1/2 @ 2 1/2	6,750
Glue, White.....	18 @ 35	630
Glue, Sheet.....	18 @ 35	630
Gum, Copal.....	1 @ 1 1/2	1,500
Gum, Damar.....	1 @ 1 1/2	1,500
Gum, Shellac, English.....	1 @ 1 1/2	1,500
Gum, Shellac, English, d.....	1 @ 1 1/2	1,500
Mineral Wool, ordinary.....	1 @ 1 1/2	1,500
Mineral Wool, extra.....	1 @ 1 1/2	1,500
Naphtha, 70°.....	9 1/2 @ 9 1/2	8,775
Naphtha, 70°.....	9 1/2 @ 9 1/2	8,775
Pumice Stone, 2 @ 100.....	2 @ 100	200
Pumice Stone, powdered.....	2 @ 100	200
Pine Tar, bbls.....	2 @ 100	200
Pitch.....	2 @ 100	200
Plumbago, E. L. Po.....	2 @ 100	200
Plumbago, American.....	2 @ 100	200
Plumbago, Gun Powder Glazing.....	2 @ 100	200
Plumbago, Shot Polish.....	2 @ 100	200
Putty, in bladders.....	2 @ 100	200
Putty, in bulk.....	2 @ 100	200
Rosin, Strained and Good.....	2 @ 100	200
Rosin, E. & F.....	2 @ 100	200
Rosin, G. & H.....	2 @ 100	200
Rosin, I. & K.....	2 @ 100	200
Rosin, M. & N.....	2 @ 100	200
Spirit Turpentine.....	2 @ 100	200
Stove Polish, Dixon's.....	2 @ 100	200
Stove Polish, Rising Sun.....	2 @ 100	200
Stove Polish, Gem.....	2 @ 100	200
Stove Polish, Jet Black.....	2 @ 100	200
Waste, No. 1 Cop.....	2 @ 100	200
Waste, No. 1 White Machine.....	2 @ 100	200
Waste, No. 2 White Machine.....	2 @ 100	200
Waste, No. 1 Colored.....	2 @ 100	200
Waste, No. 2 Colored.....	2 @ 100	200
Waste, Washed Machine.....	2 @ 100	200
Whiting, Spanish, 100 lb.....	2 @ 100	200

## Imports.

The Imports of Iron and Steel, Hardware, &c., at this port from December 4 to December 10, inclusive, were as follows:

Iron and Steel.	Tons.
Pig Iron: Crocker Bros.....	550
R. Crocker & Co.....	400
G. W. Stetson & Co.....	300
N. S. Bartlett.....	100
J. Williamson & Co.....	100
Iron Ore: A. Earnshaw.....	1,866
J. M. Ceballos & Co.....	1,710
Spiegel Eisen: J. A. Jansen.....	840
Crocker Bros.....	554
C. L. Pierson & Co.....	15
Steel: R. F. Downing & Co.....	25
R. H. Wolff & Co.....	30
W. F. Wagner.....	10
T. Taylor.....	7
F. S. Pidditch.....	5
C. Hugill.....	4
Newton & S.....	4
J. Abbott & Co.....	3
C. F. Baker.....	3
Steel Rods: Naylor & Co.....	150
A. Heyn.....	108
Cary & Moen.....	27
Steel Billets: J. Abbott & Co.....	965
Naylor & Co.....	145
Steel Plates: Union Bridge Co.....	43
Naylor & Co.....	25
R. Crocker & Co.....	9
Steel Sheets: Pierson & Co.....	22
The Abendroth R. Co.....	10
A. Milne & Co.....	7
Steel Bars: Naylor & Co.....	13
Union Bridge Co.....	5
Hoop Steel: A. R. Whitney & Co.....	251
Steel Hoops: Naylor & Co.....	10
Steel Angles: Union Bridge Co.....	61
Iron Rods: A. R. Whitney & Co.....	50
Iron Beams: R. F. Downing & Co.....	4
Iron Pipe: W. H. Wallace & Co.....	476
Scrap Iron: Burgess & Co.....	60
Wrought Scrap Iron: H. N. Holt.....	1
Channel Bars: Union Bridge Co.....	7
Iron Bars: Jas. S. Wilson.....	50
Sheet Iron: T. B. Coddington & Co.....	50
Tin Plates	Boxes.
Dickerson, Van Duzen & Co.....	11,778
Phelps, Dodge & Co.....	8,063
Pratt Mfg. Co.....	4,959
G. B. Morewood & Co.....	3,339
T. B. Coddington & Co.....	3,246
A. A. Thomsen & Co.....	2,418
N. L. Cort & Co.....	2,375
Bruce & Cook.....	1,719
Central Stamping Company.....	1,671
S. Shepard & Co.....	1,195
Wheeler, F. & S.....	1,149
Naylor & Co.....	1,100
R. Crocker & Co.....	750
J. Byrne & Son.....	640
Whitmore & Co.....	488
R. H. De Milt & Co.....	210
W. F. Wagner.....	41
American Meter Co.....	7
Metals.	Pounds.
Ph: J. Abbott & Co.....	280,116
Bidwell & French.....	69,600
D. Thomsen & Co.....	44,909
Naylor & Co.....	57,029

Nickel: McCoy & Sanders..... 15,000  
Type Metal: Jas. Fraser..... 234,832  
Antimony: Edw. Hill & Son..... 50  
Phelps, Dodge & Co..... 40  
Irons and Metals Warehouse from December 4 to December 10 inclusive.....  
Old Iron Rails: W. H. Crossman & Co..... 200  
J. & W. Seligman..... 101  
Exports of Metals from December 4 to December 10, inclusive.....

Tin: Muller, S. & Co..... 149,520  
Copper: American Metal Company..... 210,614  
Copper Matte: Williams & Terhune..... 1,817,513

## Hardware, Machinery, &amp;c.

Baur, C. M. Vom, cs., 7  
Behr, H. Mach'y, pkgs., 4  
Burkinshaw, W. Hdw., pkgs., 4  
Clark, G. A. & Bro., Mach'y, pkgs., 5; do., cs., 30  
Curley, J. & Bro., case, 1  
Downing, R. F. & Co., Chains, cs., 17  
Eaton, E. W. Mach'y case, 1  
Erie Dispatch Company, Mach'y, case, 1  
Field, Alfred & Co., cs., 8; Hdw., pkgs., 7; Guns, case, 1  
Folsom, H. & D., Arms, cs., 23  
Graef Cutlery Company, Cutlery, cs., 3  
Godfrey, C. J., Arms, cs., 3  
Gurney, F. B., How, case, 1  
Hammacher, Schlemmer & Co., Nails, cs., 29  
Hartley & Graham, Arms, cs., 46  
Hernsheim, G. Mach'y, pkgs., 16  
Johnston, J. & Co., Mach'y, pkgs., 119  
Kasor, A., cs., 9  
Kidd, J., Gas Fittings, case, 1  
Knauth, Nachod & Co., Mach'y, case, 1  
Lambertson, Furman & Co., Arms, cs., 4  
Lau, J. H., & Co., Arms, cs., 12  
Merchants Dispatch Company, Arms, cs., 16  
Noyes, Smith & Co., Hdw., cs., 5  
Pratt & Farmer, Hdw., cs., 6  
Schoverling, A., Arms, cs., 24  
Schoverling, Daly & Gales, Arms, cs., 21  
Taylor, Thos., Hdw., cs., 5  
Uhlmann, S. & F., Mach'y, pkgs., 30  
Watjen Mfg. Company, Mach'y, cs., 12  
Wiebusch & Hilger, Hdw., cs., 8; do., csks., 3  
Order—Hdw., pkgs., 7

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## MARK C. FARR,

MANUFACTURERS' AGENT.

CEDAR RAPIDS, IOWA.

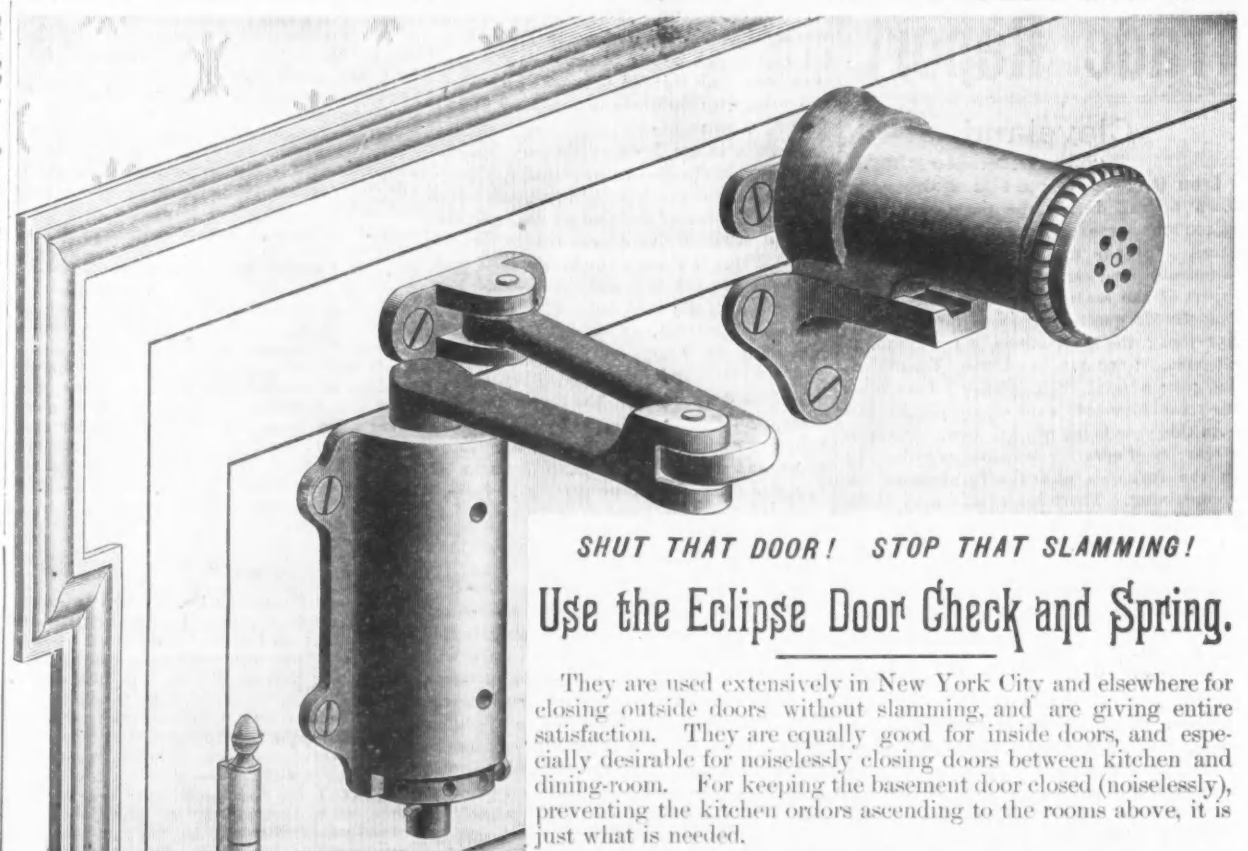
CATALOGUES, LOWEST PRICE LISTS AND DISCOUNTS SOLICITED.

**WINDOW BLIND WORKER.**  
Opens and closes the blinds without raising the window. Blinds held automatically in any position.  
**A. H. DODD,**  
South Orange, N. J.

## DRILL GUIDE AND STEADY REST.

**QUICK CENTERING.**  
TRUE DRILLING.  
For guiding twist or fluted drills for lathe work. Will keep the drill from shifting when blow-holes are in castings. Send for circulars.  
**ENERGY MANUFACTURING CO.,**  
1115 to 1123 So. 15th St., Philadelphia, Pa.

**THOMAS J. ADDRESS,**  
Manufacturer of Glass Cutters,  
Every Address Tool Warranted.  
34 Duane St., New York.



SHUT THAT DOOR! STOP THAT SLAMMING!

## Use the Eclipse Door Check and Spring.

They are used extensively in New York City and elsewhere for closing outside doors without slamming, and are giving entire satisfaction. They are equally good for inside doors, and especially desirable for noiselessly closing doors between kitchen and dining-room. For keeping the basement door closed (noiselessly), preventing the kitchen doors ascending to the rooms above, it is just what is needed.

For Sale Everywhere. Manufactured by SARGENT &amp; CO., New York and New Haven, Conn.

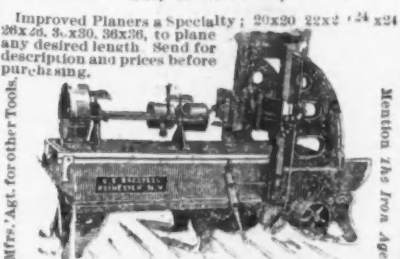
## AXLEINE



is a fine quality of Axle Grease, put up in square tin boxes containing one pound, beautifully decorated in assorted colors, designed especially for the Hardware Trade. Showy and attractive shelf goods.  
Send or sample and prices.  
**LOVELL TRACY & CO.,**  
71 Asylum St., Hartford, Conn.

## BRETTELL &amp; WILSON,

Water St., Rochester, N. Y.



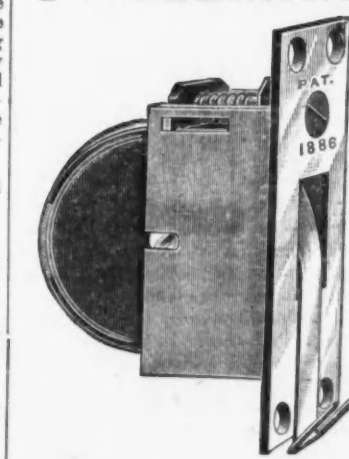
## THE HALL MFG. CO.

MANUFACTURERS OF  
Emery Grinders, Surface Milling Tool, Twist Drill and Polishing Machines.  
Send for Catalogue, free.  
**THE HALL MFG. CO.,**  
12th & Buttonwood Sts., PHILADELPHIA, PA.

## A NOVELTY IN SHOVELS.

**PATENT SOLID CAST STEEL SOCKET SHOVELS AND SPADES.**  
Forged from a single piece of Cast Steel, without welding. The best, strongest and handiest ever made. For sale by  
**GEO. W. BRUCE,**  
821 Cherry Street, PHILADELPHIA, PA.  
34 Duane St., New York.

## THE PULLMAN SASH BALANCE



A MORE PERFECT and ECONOMICAL BALANCE THAN WEIGHTS  
No boxes or pockets in frame necessary.  
**IT IS ADJUSTABLE.**  
IT ONLY REQUIRES SPACE OCCUPIED BY ORDINARY SASH PULLEY.  
It relieves the ENTIRE HEFT of sash. A 100-lb. sash works as easily as a very light one.  
APPLIED TO OLD WINDOWS AS WELL AS NEW.  
Is guaranteed to last a lifetime.  
A FAIR DISCOUNT TO THE TRADE.  
Send for description and price list.  
**PULLMAN SASH BALANCE CO.,** Rochester, N. Y.

## THE ESSEX HORSE NAIL CO., LIMITED

ESSEX ESSEX CO., NEW YORK.  
**The Essex Horse Nails**

Are drawn from the best Swedes Iron Rods only. They are hot forged and cold-pointed rendering them tough, stiff and easy driving, and are warranted  
**FIRST-CLASS IN EVERY RESPECT.**  
All Nails branded "ESSEX" are Fully Guaranteed.  
**J. C. McCARTY & CO.,** 97 Chambers St., New York, AGENTS.

## THE E. J. MANVILLE MACHINE CO., BUILDERS OF Automatic Machines

FOR WORKING WIRE AND METAL IN ANY FORM DESIRED.  
Hand, Clock, Spinning, Trimming, Tapping, and Buffing Lathes.  
Hair, Drapery and Common Dress Pin Machinery.  
Machines for Rolling Threads on Screw Blanks. Punches Dies and Tools of all kinds.  
Power and Foot Presses. Drawings and Patterns a Specialty.  
**86 MEADOW ST., WATERBURY, CONN.**

## BELLAIRE NAIL WORKS,

MANUFACTURERS OF

## Steel Nails, Blooms, Billets and Slabs.

WORKS AND OFFICE: BELLAIRE, OHIO.

## KEEP YOUR BELTS FROM SLIPPING

BY USING  
**The Patent FRICTION COVERING for Pulleys.**  
CHEAP. - EASILY APPLIED. - NO RIVETS. - EFFECTIVE.  
SATISFACTION GUARANTEED.  
**THE NATIONAL PULLEY COVERING CO.,**  
Bowly's Wharf & Wood St., BALTIMORE, MD.

AGENTS WANTED  
State and County  
Rights for Sale.  
WRITE FOR CIRCULARS





## FRANCIS AXE CO. Buffalo, N. Y.

Manufacturers of STANDARD and ALL-STEEL AXES.

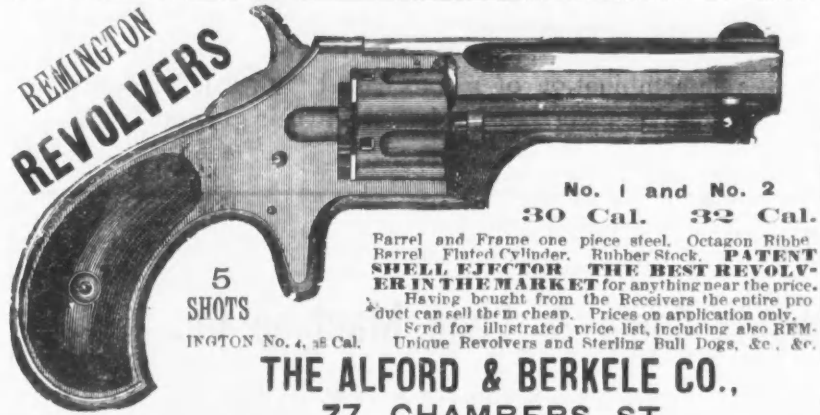
Will make Special Prices on

# AXES

Ordered before December 1st.

Send for New Illustrated Catalogue. Order sample box of our New

## "BUFFALO" BEVELED AXE.



No. 1 and No. 2  
30 Cal. 32 Cal.

Barrel and Frame one piece steel. Octagon Ribbed Barrel. Fluted Cylinder. Rubber Stock. **PATENT SPLIT EFFECTOR THE BEST REVOLVER IN THE MARKET** for anything near the price. Having brought from the Receivers the entire product can sell them cheap. Prices on application only. Send for illustrated price list, including also REMINGTON No. 4, 5 Cal. Unique Revolvers and Sterling Bull Dogs, &c., &c.

### THE ALFORD & BERKELEY CO.,

77 CHAMBERS ST.,

P. O. Box 2002. New York City.

## MERRILL & WILDER'S EXTRA SOCKET FIRMER CHISELS

SOLID CAST STEEL.

These Tools are tempered by an improved process, insuring a Perfect Cutting Edge.



### CONDITIONS OF WARRANTY:

We warrant all goods bearing our trade-mark to be perfect when they leave the shop, so far as the material and workmanship are concerned. If a tool proves too soft and bends on the edge or breaks in consequence of a flaw in the steel and is returned to the person from whom it is bought within thirty days from date of purchase, a new tool will be given in exchange. If it is broken where the steel is sound, will not be exchanged.

Price, No. 10 Set: 12 Chisels from 1/4 to 2 inches sharp ended and set ready for use, in Fancy Wooden Box. \$6.00

These Chisels can be obtained through any Wholesale Hardware House in the United States.

C. E. JENNINGS & CO., 79 Reade and 97 Chambers St. NEW YORK CITY.

## THE BOSTON KNOB CO.,

169 High Street, Boston.

### NEW KNOBS

Not affected by Heat, Cold or Moisture

### COLORS

CONSIDERED MOST DESIRABLE.

3. Garnet (Dark Cherry or Mahogany).
7. Olive (Dark).
8. Olive (Light).
10. Drab.
13. Brown (Light).
14. Brown (Light Cherry).

All Colors Warranted Not to Fade.

List Price, \$10 per Doz.

Send for Illustrated Catalogue.

SHERMAN & FEARING, 100 Chambers St., New York, General Agents.

## W. BINGHAM & CO.,

MANUFACTURERS AND DEALERS IN

### HARDWARE,

RAILWAY, MINERS', ENGINEERS', ARCHITECTS', MECHANICS', MACHINISTS' and FACTORY TOOLS and SUPPLIES.

146, 148 and 150 Water St., CLEVELAND, OHIO.

## ELIZABETHPORT STEAM CORDAGE CO.,

MANUFACTURERS OF MANILA, SISAL AND TARRED

### CORDAGE OF ALL KINDS.

BINDER TWINE A SPECIALTY.

E. M. FULTON,  
D. E. WHITLOCK,  
A. W. LUKENS.

46 South Street, NEW YORK.

## KNISELY & MILLER,

129 & 131 South Clinton St.

CHICAGO.,

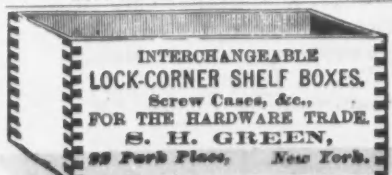
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CORRUGATED

### ROOFING AND SIDING.

Send for Circular and Prices.



INTERCHANGEABLE LOCK-CORNER SHELF BOXES. Screw Cases, &c., FOR THE HARDWARE TRADE. S. H. GREEN, 22 Park Place, New York.

## PREMIUM SPRING WHIFFLETREE HOOKS.



MANUFACTURED BY  
HEADS IRON FOUNDRY  
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SPEAKING TUBES, Nickel-Plated, Bronze and Porcelain. Alarm Whistles, Bell Tubing. Elbows in every size and variety. OWEN WALSH, Mfr., 105 Walker St., New York.

## MANUFACTURING.

### Iron and Steel.

In answer to a report that the Bellaire Nail Works, of Bellaire, Ohio, had decided to return to the use of coal as fuel, instead of natural gas, on account of the diminished supply of the latter fuel, we received the following from the company, under date of the 6th inst: "The 15 steam boilers in our steel works are now using coal, but all the balance of our works is still running on natural gas, and we hope to be able to do so right along. The trouble with the natural gas supply is that the main-pipe is not large enough. With an adequate main from the wells we believe there would be no trouble with the gas supply."

The Duquesne Tube Works Company is a new manufacturing interest established on the other side of the Monongahela, near the Duquesne Steel Works, Pittsburgh. The factory is a small one devoted to the specialty of turning out boiler tube flues and will start turning out pipe next week. The company has one furnace in operation. The manager is W. L. Hurd, formerly manager of the Continental Tube Works, at Soho. The company is composed principally of McKeesport people, with H. C. Bredeen, president; H. C. Stuckalager, treasurer, and Samuel Briggs, secretary. The material is now on hand and 75 men will be started on the works next week.

The rolling mill which has been in contemplation at Peoria, Ill., is still being talked about, the projectors having sufficient faith in the advantages of the locality to make them hope that eventually they may be able to interest capitalists in the undertaking, although not much encouragement has been secured thus far.

The Union Steel Company, of Chicago, shut down their steel works and rail mill on the 5th inst., having completed all the rail contracts on their books. The month of December will be devoted to general repairs, so that a good start can be made in January, by which time it is hoped that the railroad companies will be in the field with their orders for next year's delivery.

The Amalgamated Association has formally declared a strike at the Solar Iron Works of Wm. Clark's Son & Co., at Pittsburgh. The question in dispute was the two job system. The firm wished a roller named Sims to hold the position of roller of the 7 and 9-inch mills, and declared a shut-down if he should not be allowed to do so. They claimed that they could not procure any other roller competent to hold either position to their satisfaction. Five hundred men were thrown out of employment.

A boiler in the Hubbard Iron Company's rolling mill, at Hubbard, Ohio, exploded last week. The boiler was an old one. The explosion wrecked and damaged the mill considerably, and a fortnight will be occupied in making repairs.

Graff, Bennett & Co., iron manufacturers, at Pittsburgh, have nearly completed their work at the Thirty-second street mill in that city, only 15 men being at work, finishing up on small jobs. On the 1st of January they will move all their employees to the new mill at Millvale, which will begin operations with the new year. The entire plant will be taken possession of by the Carbon Iron Ore Company, of New York, who purchased it a year ago.

The bridge manufacturers of Pittsburgh are enjoying a season of unusual prosperity, and are compelled to run their works to their utmost capacity in order to get out work as fast as it is needed. The Keystone works are now running double turn. They have recently built a mile of elevated railway in New York City, and are at present building a bridge 1550 feet in length, to span the Missouri river at Kansas City. They are also building five bridges for the Kansas and Oregon Railroad Company. The Pittsburgh Bridge Works have contracts on their books aggregating \$200,000, for Western railroad works.

The Hampden Foundry and Machine Company, of Clifton, W. Va., have been chartered with a capital stock of \$10,000 to manufacture stoves, machine work, &c. The following are the incorporators: R. J. Redman, John A. Redman, B. E. Stevenson and H. J. Morton, of Clifton, W. Va., and E. S. Grant, of Middleport, Ohio.

The Phoenix Furnace, of Brown, Bonnell & Co., Youngstown, Ohio, is being relined and a number of improvements added.

We take the following items from the Ironton (Ohio) Register of the 8th inst. concerning the manufacturing establishments at that place: "Belfont is turning out 50 tons a day, mostly No. 1. It is using 80 per cent. native and 20 per cent. Missouri ore. Mt. Vernon Furnace got a supply of water last week, and turned on the blast. The Belfont Nail Mill is running full. The forge department goes on to day or to-morrow, and runs for an indefinite time. Belfont made some steel nails last week that were fine. The experiment of rolling steel slabs was a success. Iron and Steel Furnace is running as usual. Their fuel is now three-fourths coke and one-fourth coal. Three of the new boilers of the Lawrence mill will make steam to-morrow, and then the mill will be put on full. A new building has been erected for the battery of boilers."

Elia Furnace, operated by the Wheeler Furnace Company, at Sharon, Pa., will be blown out about the first of the year for the purpose of making some needed repairs.

The large lap-weld furnace at the pipe mill of the Reading Iron Works, Reading, Pa., was shut down recently, throwing about 50 men out of employment.

The Howard Rolling Mill Company, Limited, have erected and recently put in operation at Howard, Center County, Pa., a mill for the manufacture of iron and steel wire rods. They operate a charcoal forge in connection with the mill, in which they manufacture blooms for iron rods, but they purchase billets for steel rods. Very satisfactory results have been obtained from domestic billets, but in order to control their raw

material as far as possible the company are erecting a Bessemer converter, which they expect to have in operation early in the coming year. They will cast small ingots, and expect to make enough to supply their rod mill, which has a present capacity of 40 tons a day, double turn. The rods rolled have from the start been very perfect, free from fins. Operations thus far have demonstrated to the satisfaction of the owners of the works, who are Western parties, that they can make steel wire rods at a price enabling them to compete with foreign rods at current rates.

J. H. Leeds, secretary of the Glasgow Iron Company, Pottstown, Pa., calls attention to the fact that our announcement that the "works" of the company have gone on single turn may lead to some misapprehension. It is only their steel plant which is not running full. Their plate and bar mills are producing to their fullest capacity.

We have a letter from Mr. J. P. Witherow, of Pittsburgh, denying the statement which appeared in our issue of the 1st inst. in regard to an alleged collapse of brickwork at the new furnace at Saxton of Messrs. Robert Hare-Powell's Sons & Co. Mr. Witherow writes: "We made a contract with the firm to build a furnace and three Whitwell stoves. The work was finished according to agreement with perfect satisfaction to the firm. The furnace has not been put in blast, and the brickwork stands to-day as complete a piece of work as was ever put up in a furnace in this country. There is no dispute between us and the firm, the only reason why the furnace has not been put into blast until now being that the assignee of the firm is under the necessity of having an appraisal made. An extension has been granted the firm, and No. 2 Furnace will be put into blast before January 1. The filing of a mechanics' lien against the firm by us was done with the full consent of the latter."

The Sunbury Nail, Bar and Gudgeon Iron Mfg. Company, Sunbury, Pa., were compelled to shut down their mills to day for want of soft coal. On account of the strike in the anthracite regions bituminous coal is greatly in demand.

One of a battery of eight boilers in the rolling mill of the Hubbard Iron Company, at Hubbard, Ohio, blew up on the 5th inst. The boiler was an old one, having been in use a long time. The other boilers were all thrown out of position, the stacks blown down, and the boiler house is a mass of ruins. The accident will keep the mill idle one week.

The Bethlehem Iron Company, of Bethlehem, Pa., have been experimenting for the past few months with what is known as the Archer gas-fuel process, by which petroleum is employed as the fuel. These experiments have been made in two of the company's ingot reheating furnaces, and the results accomplished have been such as to lead the company to contract for two additional plants, which are now in course of erection.

Belmont Furnace, of the Belmont Nail Company, at Wheeling, W. Va., was blown out last week, for the purpose of being relined and repaired.

About 12 years ago the Mount Hope Iron Works Company, of Somerset, Mass., sold part of their plant to the Old Colony Iron Works, of East Taunton, for \$117,000. Recently the Mount Hope Company bought back this property for \$35,000. Immediately workmen were engaged to repair it thoroughly. It is now said that the company intend to move their nail works into the building recently purchased and equip the old building for a lead works to produce sheet lead, lead pipe, &c. The concern will probably be ready to commence operations in March or April.

The Glendon Iron Company, of Easton, Pa., have blown out their No. 4 furnace. This is the second furnace they have shut down within a week. The reason assigned is poor and high-priced coal and the good opportunity to repair the stack.

The 16-inch bar mill, at the American Iron Works of Jones & Laughlins, Limited, Pittsburgh, which has been shut down for some time, resumed operations on the morning of the 12th inst. About 100 additional men were given employment.

The Standard Iron Company, of Bridgeport, Ohio, have made arrangements with the Wheeling Natural Gas Company by which sufficient gas will be furnished them for the running of the entire mill, thus avoiding the necessity of using coal.

Owing to a lack of orders the Clapp-Griffith department of the Spang Steel and Iron Company's works, at Etna near Pittsburgh, have been shut down. It is not expected that operations will be resumed before the beginning of the new year.

It is expected that the Edgar Thomson Steel Works, at Braddock, Pa., will close the present year's contracts some time next week. The extensive works will then be closed down and important improvements and repairs will be made.

### Machinery.

A dispatch from St. Louis dated December 9 says: "The machine shop belonging to the South St. Louis Foundry Company, of which Robert J. Kilpatrick is president, situated in South St. Louis, burned to-night. The loss is \$20,000."

The Baldwin Locomotive Works, at Philadelphia, have recently received an order from the Philadelphia and Reading Railroad for 35 engines, work on which has been commenced.

Messrs. E. E. Magovern and H. W. York, formerly with the New York Steam Company, have, for the present, established themselves as consulting engineers at 22 Cortlandt street, New York.

The wagon factory, foundry and machine shop of the Ruka Brothers Mfg. Company, at Boscebel, Wis., were destroyed by fire on the evening of the 7th inst. The fire started in the engine-room about 6.30 p. m., and in an hour and a half the entire works were in ashes. The loss is from \$15,000 to \$20,000, with no insurance. Every

machine in the shop is a total loss and there were at the time 250 pairs of bob sleds in process of manufacture, besides other work. A letter to us from the company, dated the 9th inst., states that about half of the foundation had then been laid for rebuilding the works, and it was expected that they would be running again in about six weeks.

The Mason Regulator Company, of Boston, Mass., write us in a recent letter that their locomotive valve has been adopted by the following railroads: Pennsylvania, Boston and Albany, Old Colony, Lehigh Valley, Baltimore and Ohio, East Tennessee, Virginia and Georgia, Connecticut River, Burlington, Cedar Rapids and Northern, &c.

Mr. George E. Brettell, of Rochester, N. Y., manufacturer of machinists' tools, writes us to the effect that he has entered into partnership with Mr. Wm. A. Wilcox and that the business will be continued under the firm name of Brettell & Wilson. Mr. Wilson has had charge of the works of the Woodbury Engine Company for the last 17 years.

The Curtis & Co. Mfg. Company, of St. Louis, report the following recent sales: No. 2 double giant saw mill and a gang edger for Tennessee; two 60 horse-power boilers, No. 5 Hooker steam pump, two saw trimmers and Prescott steam feed for Texas; two double giant saw mills for Texas; 60 horse-power boiler for Texas.

The Billings & Spencer Company, of Hartford, Conn., gave an order last week for 100 gross tons of steel, to be used by them at their works in the manufacture of drop forgings for parts of locomotives, agricultural implements, guns, pistols, wrenches, sewing machines and machinery generally. Business is unusually good with this company, and every department is run to its full capacity.

A meeting of the stockholders of the Westinghouse Air Brake Company will be held at their office, in the city of Allegheny, on January 5, 1888, at 2 o'clock, p. m., for the purpose of holding an election upon the question of an increase of the capital stock of such company and the disposition thereof in accordance with a plan to be submitted by the directors to said meeting.

A new catalogue and price list of tinners' machines and tools and machinery for working sheet metal has just been issued by the Niagara Stamping and Tool Company, of Buffalo, N. Y. It embraces 130 pages, and is profusely illustrated.

Mr. Robert E. Masters has been appointed general superintendent of the Marshall Car Wheel and Foundry Company's plant, at Marshall, Texas, and in consequence has resigned his position as manager of the cast-iron department of the Treadgear Iron Works, to take effect on the 31st of this month.

The Kansas City (Mo.) Car and Wheel Works will be completed about the middle of December, and will give employment to 800 men. The estimated capacity of the works will be equal to the construction of 10 freight cars a day.

The Fort Payne Coal and Coke Company, which has a capital stock of \$100,000, propose to erect coke ovens at Fort Payne, Ala. The officers are: J. M. Ford, Kansas City, Mo., president; U. B. Pearsall, of Fort Scott, Kas., vice-president; E. W. Godfrey, of Fort Payne, Ala., secretary, and F. Moody, of Kansas City, treasurer.

### Hardware.

The Buffalo Hammer Company, Buffalo, N. Y., refer to the increase in their business this year, especially in the edge tool department, as having shown the necessity of greater capacity. They have accordingly just completed the erection of a new temporary shop, and have doubled the size of their grinding and polishing rooms. With this increased capacity, which they refer to as nearly double that which they have had during the past year, the company state that they are in a position to fill all orders for their extensive line promptly. These additions having been made within a year of the erection of their new factory is in itself an indication of the company's expectations having been more than realized.

Louis Stutz, proprietor of the Excelsior Wire and Iron Works, St. Louis, recently purchased the plant of the St. Louis Wire Company, including 24 wire looms. On or about January 1, he will begin the manufacture of wire cloth and sieves at his old works, having made preparations to connect his new plant by leasing the top floor of the building adjoining. He now manufactures a line of flower stands, office rails, iron fence, fire guards and garden settees, and does other wire and iron work by contract.

The extensive works of the Falls Rivet Company, at Cuyahoga Falls, Ohio, were partially destroyed by fire on the 8th inst., causing a loss of about \$30,000, covered by insurance. The works will be rebuilt at once.

The Continental Wire Company, St. Louis, Mo., recently organized, are now in operation manufacturing their Eagle brand of barb wire, and also a new style with parallel strands. The plant of the company is at the junction of Souland and De Kalb streets, St. Louis, close to the St. Louis, Iron Mountain and Southern Railroad, and with connections with the Missouri Pacific Railroad. The works are on an area of 300 x 150 feet, and include a three-story brick building, 120 x 48, and galvanizing machine shops for the manufacture of wire.

It is stated that the Grant Wire and Spring Company, of Lockport, Ill., have not lost a day, except Sundays and holidays, since their wire mill was started two years ago. The works run regularly 22 hours out of 24. The time of working has been arranged on an original plan, which has proved very popular with their workmen. The night turn each week works five nights of 12 hours each, while the day turn works six days of 10 hours each. The men alternate from week to week. In this way each turn works 60 hours per week, but no work is done on Saturday night.

It is stated that a large manufactory, to be devoted to the manufacture of knives, will be erected in the near future at Akron, Ohio.



# POST'S "ZERO" METAL,

Registered in U. S.,

## FOR JOURNAL BEARINGS.

Messrs. E. L. POST & CO. beg to announce that by long and exhaustive tests and experiments with a machine designed and made expressly for this purpose, they have succeeded in producing, by an entirely new process, a combination of metals called "Zero," and, after comparative tests against the best brands of genuine Babbitt and so-called White Metals, they place it upon the market with their guarantee of its superiority confirmed by the official tests annexed:

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### THE EDISON MACHINE WORKS,

CABLE ADDRESS: 86 to 108 Goerck Street.  
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Messrs. E. L. Post & Co., No. 10 Peck Slip, N. Y.  
Gentlemen:—At a test made under our supervision with a machine designed for testing the friction of different metals, the accuracy of which cannot be doubted, we beg to inform you that the average friction of metals tested was 120 per cent. more than the Post's Zero Metal.

### MORGAN IRON WORKS,

JOHN ROACH & SON, Proprietors, Foot Ninth Street, East River.  
Messrs. E. L. Post & Co., No. 10 Peck Slip, N. Y.  
Gentlemen:—Having been interested in the progress of the comparative test of Babbitt and Non-Friction Metals lately made at the Edison Machine Works, would say that they were accurate and results obtained correct. Although our own best Babbitt and Baker's White Brass submitted by us for test were badly beaten, the information gained reverts to our advantage in so far as we now recognize that, by the aid of the metal-testing machine, it has opened the way to procure the "Post's Zero Metal," which we do know to be a No. 1.

Result of Comparative Tests POST'S ZERO METAL, with other Babbitt and Non-Friction Metals under Supervision of Edison Machine Works, Goerck Street, New York, Oct. 25, 1886:

	Carried Weight Per Square Inch	Revolution of Shaft Per Minute.	Temperature of Grease.	Average Temperature.	Percentage of Friction Over Post's Zero Metal.	Remarks.
Post's Zero Metal - -	90 lbs.	740	50	109	—	The result of these tests show an average of 120% more friction than Post's Zero Metal.
Edison Machine Works Best Babbitt - - -	90 "	740	50	147	64	
Hart Metal - - -	90 "	740	72	139	81	
Taylor's Arctic Metal -	90 "	740	66	160	118	
Thos. Wildes Genuine Babbitt - - -	90 "	740	66	141	74	
J. Roach & Son Best Babbitt - - -	60 "	740	66	205	223	
Baker's White Brass -	60 "	740	66	141	74	
Illinois Smelting Co. -	45 "	740	59	163	108	
Diamond Metal - - -	45 "	740	59	217	216	

### Webster, Camp & Lane Machine Co.,

NORTH MAIN STREET,

Near Academy of Music.

AKRON, OHIO, Jan. 12, 1887.

Messrs. E. L. Post & Co.,  
NEW YORK.

Gentlemen:—With pleasure we submit the following comparative tests made by us this day of anti-friction metals. The high record in your favor stamps "Zero Metal" as the most profitable for manufacturers and consumers.

J. W. CHAMBERLAIN, Supt.

	Carried Weight Per Square Inch.	Revolution of Shaft Per Minute.	Temperature of Grease.	Average Temperature.	Percentage of Friction Over Post's Zero Metal.	Remarks.
Post's Zero Metal - -	123 lbs.	1050	70	117	—	The result of these tests show an average of 79% more friction than Post's Zero Metal.
Hoyt's Genuine Babbitt	123 "	1050	70	130	28	
Post's Zero Metal - -	90 "	1050	70	109	—	
Paul Reeves Special -	90 "	1050	70	130	54	
Hoyt's "Extra" - - -	90 "	1050	70	182	187	
Phosphor Babbitt - -	90 "	1050	70	122	30	
Hoyt's No "4" - - -	90 "	1050	70	150	105	
Bostwick's Polar Metal	90 "	1050	70	121	31	
Composition Brass - -	45 "	1050	70	116	118	

## "ZERO METAL FOR BABBITTING."

A FEW FACTS WORTH KNOWING!

This Metal has been thoroughly tested under the following conditions:

- On High Speed Motor Engines.
- On the Fastest Running Wood-working Machinery.
- On Highest Speed Cold Swing Saws.
- On Merchant and Bar Iron Mills.
- On the largest Boiler Plate and Sheet Mills.
- Under 35-Ton Fly Wheel Shafts.

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N. B.—We prefer that Zero Metal should be bought through our Regular Dealers, but in places where "Zero," is not kept in stock by the trade, orders sent direct to us will receive prompt attention.

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GRANT & DUNN, Syracuse, N. Y.  
LOUIS ERNST & SON, Rochester, N. Y.  
BUTLER & GARDNER, Pittsburgh, Pa.  
EDWARDS & WALKER, Portland, Me.  
C. E. JAMES & Co., Chattanooga, Tenn.  
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THE MACHINISTS' SUPPLY CO., Chicago, Ill.  
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MACDONALD & Co., Halifax, N. S.  
EMERY & MOORE, Rochester, N. H.  
RICHARDS & HUBBELL, East Tawas, Mich.  
SMITH & COURTNEY, Richmond, Va.  
W. A. CASE & SON, Buffalo, N. Y.  
J. M. WARREN & Co., Troy, N. Y.

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MORLEY BROS., East Saginaw, Mich.  
WADHAMS OIL & GREASE CO., Milwaukee, Wis.  
WATERS & GARLAND, Louisville, Ky.  
SUMNER, PRATT & Co., Worcester, Mass.  
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I. C. WRIGHT & Co., Fitchburg, Mass.  
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COVEL & OSBORN, Fall River, Mass.  
F. I. WEBSTER, Turner's Falls, Mass.  
JAMES CLEMENTS & SONS, Bay City, Mich.  
BARNUM BROS., Troy, N. Y.  
E. G. STUDLEY, Grand Rapids, Mich.  
JAMES H. WELLS, Tampa, Fla.  
E. V. WYSSBROD & Co., Findlay, Ohio.



## The Manufacture of Tin Plates.

BY W. STERCKEN.

(Continued from page 17, December 1.)

## TINNING.

The materials used in tinning are either tin or an alloy of tin and lead, or, more rarely, with spelter, and for covering the material bath and filling the first and last kettle of the tinning hearth, grease is used. For bright plates only the purest tin can be used. In England, Australian tin, is employed, the latter especially for the first coat, the final coat being a deposit of the purest Australian tin. Latterly Australian Banca and Billiton is so pure that in many tin-plate works it is no longer subjected to the preliminary refining. At some works the tin is refined without reference whatever to the source from which it is obtained, and the tin which has become impure during the course of working is either sold or treated again.

For covering the bath of tin grease is used. It decomposes at a temperature of 300° Celsius, while the melting point of tin is 228°. At this temperature, and at higher heats, the tallow formerly used exclusively strongly developed fumes, which formerly made the work of tinning hearth very unhealthy. With the palm oil now generally employed, which is imported in large quantities from the west coast of Africa, this feature is not so strongly developed. Lager grease is known as the best, because it contains less water and impurities. In manufacturing terne plates, the coating of which (three parts of lead and one part of tin) melts only at 250° Celsius, the fumes developed from the grease are so strong that it is replaced in many localities by chloride of zinc. The latter melts at a temperature of 150°, develops no fumes and sublimes only at a temperature of 700° Celsius. Another mixture largely used is zinc salmiac, prepared by dissolving 10 parts of zinc in strong hydrochloric acid, adding 11 to 16 parts of chloride of ammonia and evaporating. Such substitutes for grease are called fluxes. They act like a pickle in some respects, and their use is considered disadvantageous because particles of the fluxes adhere to plates, which easily causes rapid rusting of the finished plate.

## THE MODERN FIVE-POT TINNING HEARTH.

The accompanying engravings, Figs. 23 and 25, show a modern tinning hearth, such as is used widely, in a slight modification, in England and in other countries where tin plates are made. It consists of a block of masonry work, in which there are five kettles, *a, b, c, d* and *e*, differing in size. Each, with the exception of *a*, is provided with a simple grate, the flame of which impinges upon the pots. All of the flues unite in the main flue *g*, or in one or several cast-iron pipes, which go through the smoke pipe placed above the hearth to carry off the fumes of the grease. Every hearth has a grease pot, *a*, a coarse pot, *b*, and brushing pot, *c*, and, finally, a rolling pot, *e*. Between *b* and *c*, or *c* and *d*, the brushing platform *s* is arranged. The pots *a* and *c* are filled with palm oil, *b, c* and *e* are filled with tin. In the working pot *e*, are located several, generally five, rolls, *h*, Figs. 26, 27 and 28, rotating in such a way that the two upper left rolls carry the plate downward, and the others lift it out of the grease. The two sets of rolls rest upon two bearings, which are attached to the upper flange of the pot by screws, *i*, and are connected with one another by rods, *k*. The upper center and the left roll has its bearings on *l*, while the bearings of the other rolls can move between *m* and *l*, and can be pressed by screws, counter weights, or by the lever *o*, against the stationary bearings, the pressure being regulated by set screws. By pressing the rolls together more or less the thickness of the coating of tin is determined. One of the rolls, usually the center upper roll, is driven, and by means of gearing, *p*, the other rolls are made to revolve in the direction indicated by arrows. It is a very important thing to have all the gearing working together uniformly, because otherwise streaky plates are made. Modern English rolls have a somewhat different construction, as will be shown in the Taylor-Leyson tinning hearth later on. The rolls consist of cast steel, and are well turned and ground. Hollow rolls have been tried in England, but have been found to be unsuitable. Before use, the rolls must be carefully tinned with the purest tin, and this must be kept up during the course of the work, which is done by pouring the tin upon the rolls from time to time. The clean surface is kept up by frequently pouring grease over them from the rolling pot. In spite of this it does occur that particles of tin ashes fasten on the rolls, which leaves behind on the plates a series of dots which may be noticed on every plate. The upper set of rolls lie with their point of contact a little below the surface of the grease. In the case of terne plates their location is a little above it. In all the drawings the level of the tin is indicated by a series of double-dotted lines, while the level of the grease is shown by a series of crosses. As already stated, two rolls force the plate into the grease, while the others take it out of it. This requires an arrangement to catch the plates when they leave the first set of rolls, and then to conduct them from below into the rolls intended to carry them out of the vat.

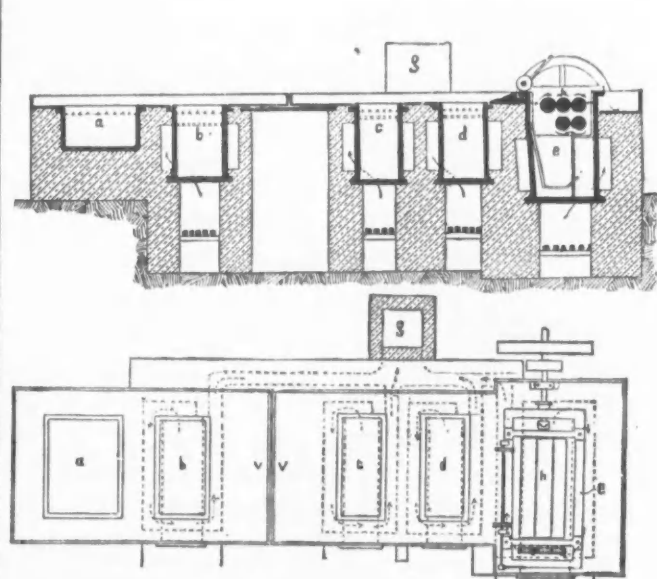
The construction of the devices for this purpose varies considerably. A contrivance of this kind used in Germany is shown in Fig. 29. On an offset of the pot two guides, *a*, are attached, upon which rests a rod, *b*, with two levers, *c*, and two rods, *d*; *c* and *d* carry the box *e*, made of round or flat iron. In the position drawn in full lines the plates which drop from the rolls *f, g* are caught, and by moving the lever into the dotted position the plate is lifted in the rolls *g*. While working satisfactorily this arrangement has a disadvantage that the box *e* must be changed to suit every change in the size of the plates. This involves loss of time in working. Figs. 30 and 31 show guide rods, *a*, so attached to one side of the pot that they are placed a little way from the

center line of the right-hand rolls. On the other side of the pot is located an arm, *b*, to which is attached the arm *c*. Along the side of the pot three levers, *i*, are arranged, which, when at rest, are so placed that their upper short arms stand a little higher than the upper bar *g*. Now, when a plate drops from the rolls upon the arms *i* it is lifted by moving the handle *k* to the left, and by the arms *i* is pressed against the guides *a* and is thus conducted into the rolls. Another device used largely in England is shown in Fig. 32. It consists of a stationary guide, *a*, the hanging rods *d*, the lower half of which is provided with a screw thread to attach the levers *e* and the reversing fingers *b*, and the counter-weighted hand lever *f*. When the lever *f* is depressed the fingers *b*, by means of the nuckles *n*, strike the bearings

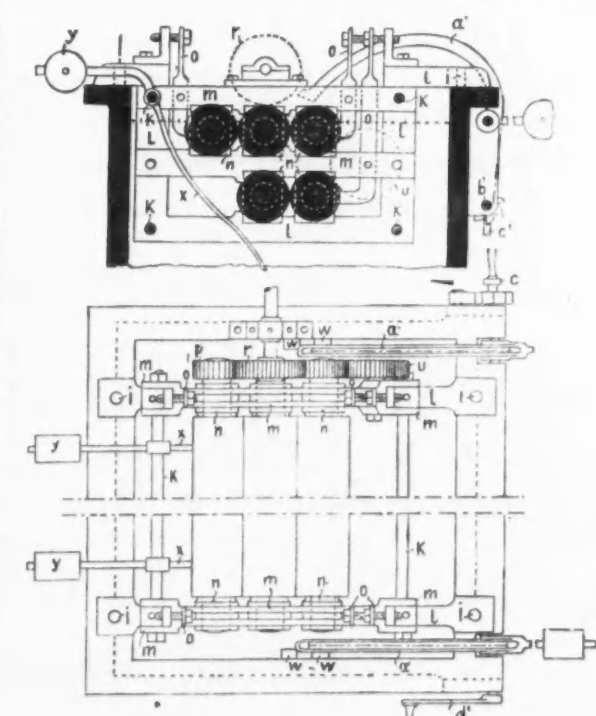
kept as high as possible without allowing the grease to catch fire, fluctuating between 300° and 400°, and rising at times up to 450°. The brushing pot *c* is filled with somewhat purer tin, and the grease covering it is also purer. The temperature is somewhat lower than in the case of *b*. Then follows the *b* of tin and the grease layer, which is kept as pure as possible, the temperature being about 250°. The rolling pot *e* must be kept filled with entirely clean liquid grease, and at a temperature which lies somewhat above the melting point of tin, say 230° to 240°. The plates which had been put into standing water for final pickling are taken out of it shortly before tinning, and are placed singly into the grease pot *a* until the latter is filled, which takes about 200 plates. The grease is hot enough to evaporate the water adher-

hand, and could work more uniformly. Now the tinner can work either way. In fact, the brushing does not play so important a part as it used to, since the introduction of the rolling pot, but in making good tin plates it is indispensable.

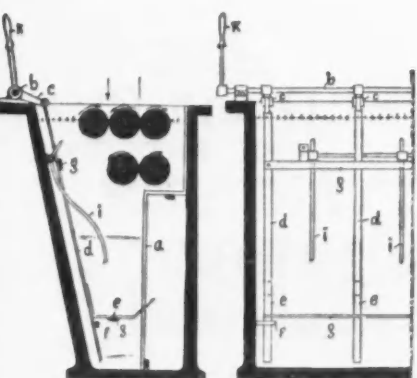
The rolls conduct the plates under the grease and drop them into the cage. The latter is lifted by the third workman, so that the plate is taken by the lifting rolls, is grasped by the same workman by a pair of tongs, and is turned over to a boy or girl for cleaning off grease. According to the pressure of the spring levers, the rolls press off the superfluous tin from the plates. It gathers in the bottom, and is pumped out by a simple cast-iron suction or force pump. At some works a smaller pot is placed next to the rolling-pot, and is filled with grease.



Figs. 23 and 24.—Vertical Section and Plan of Five-Pot Tinning Hearth.



Figs. 26 and 27.—Section and Plan of Tinning Rolls.



Figs. 30 and 31.

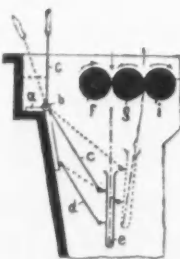


Fig. 29.

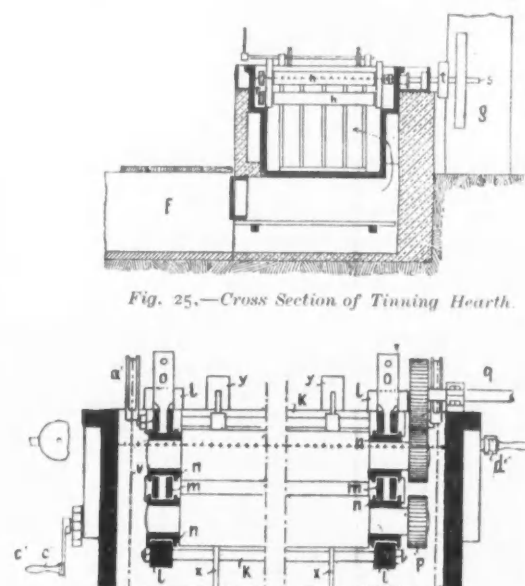


Fig. 25.—Cross Section of Tinning Hearth.

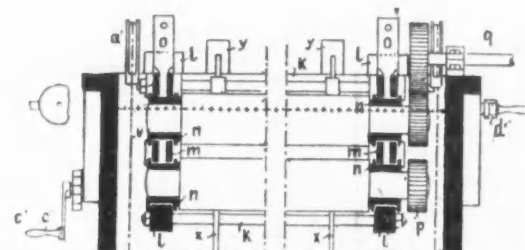


Fig. 28.—Section of Tinning Rolls.

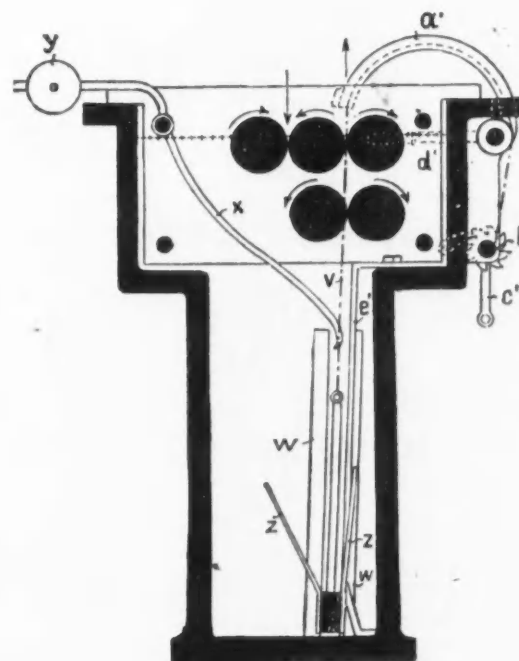


Fig. 33.

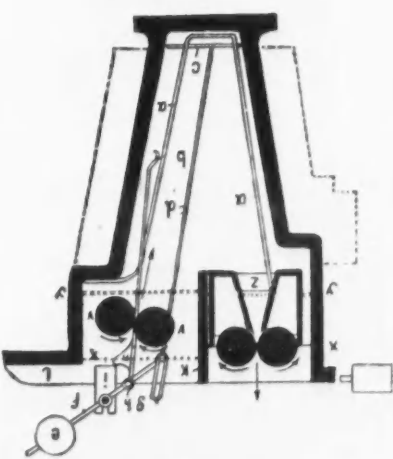


Fig. 32.—Device for Lifting Plates in Rolling Pot.

## THE MANUFACTURE OF TIN PLATES. BY W. STERCKEN.

*i*, move to the left, throw over the plates and then the latter are lifted along the rods *a* by means of arms *c*. A third arrangement used in England is illustrated in Fig. 33. The lifting apparatus is entirely distinct from the contrivance for reversing the plate. The latter consists of two simple levers, *x*, provided with counter-weights *y*. So far as the lifting arrangement is concerned, the box is provided with the two arms *z, z*, slides along the guide *w* and is attached to chains *v*, which are carried over the arm *a* to the little winch *b* and is attached to it. The latter arrangement has the object of being able to adjust the position of the box without any difficulty to any size of plate.

The pot *a*, Figs. 23 to 25, is filled with palm grease already used. It is kept at a temperature of about 100° by the conduction of heat from the fire under the pot *b*, and by the very hot grease which flows over the pot *b*, when plates are put into it. If the grease were kept at 100° or more so much steam would be developed in putting in the wet plates that the grease would boil out of the pot. The pot *b* is filled with impure tin, which in order to avoid oxidation is covered with a layer of impure grease varying from 10 to 15 cm. The temperature in pot *b* is

ing to the plates. After about 10 minutes the workman takes 20 to 30 plates out of the pot, passing them into kettle *b* vertically, where they remain about 10 minutes, to be transferred then to pot *c*. After an elapse of about 10 minutes, the brusher takes 20 plates from the kettle, and laying them on the plate *v* between this and the next pot brushes both sides of the plate with a brush soaked with grease. A third workman then seizes the plates, dips them into the pot *d* without letting them go, and lifting them out, places them between the rolls.

In the tinning hearth shown in Figs. 23 to 25, the plate travels from left to right—that is to say, the workmen who dip the plate from one pot to the next are placed so that the grease pot *b* is to their left, and the rolling pot *e* is to their right. The reverse arrangement is also employed. As currently used, the arrangement of the brushing pot *c* is placed between the brushing pot and the one following it, an arrangement which avoids any return movement of the plates. Formerly a great deal of importance was attached to the succession of the pots, and preference was given to the movement from the right to the left, because then the brusher had the brushes in his right

Though not hot, the grease is liquid. From it grease can always be poured into the rolling pot whenever the temperature in the latter rises too high.

At one of the English works the tinning hearth has two grease pots, the second being kept at a high temperature, while the first is only at an ordinary heat. As an advantage of this arrangement it is urged that by its means the plates can be given a higher temperature than in the ordinary grease-pot, and that in consequence of this the first tinning-pot need not be heated to so high a temperature, thus making the tendency toward oxidation less marked. On the other hand, this increases the number of fireplaces by one, and it seems that advantages and disadvantages compensate one another. In the manufacture of terne plates, which generally need not have a particularly pure surface, the process is shortened according to the quality of the plates to be produced, either by suppressing the brushing, or even by giving up the last tin-pot. Since the density of the lead tin alloy is 10.03—that is, greater than that of iron—7.08—arrangements must be provided to keep the plates down in the bath. This is generally done by placing weights on top of them.

The tin is filled from the brushing-pot into the first tin-pot, and from the rolling-pot into the brushing-pot, while fresh tin is put into the rolling pot. But as the tin in the first and second pots would deteriorate too much in time, they must be filled from time to time with fresh tin. Generally the rollers run only single shift, because the supervision during the night is not sufficient, and then, too, because it has been found that in continuous working the plates are less bright. This is naturally the result of the fact that oxide of tin, which forms in the bath of tin, has time during the night to collect on the surface, and can be removed at the beginning of the shift.

The drawbacks on the tinning process described may be enumerated as follows:

1. The necessity of an elaborate apparatus for five pots and four fireplaces, which require the greatest attention.

2. That the quality of the plates depends too much upon the skill and honesty of the tinning-men, in spite of the mechanical appliances employed. These come into play especially so far as the length of time which the plates remain in the tinning bath, furthermore, in the brushing, and, finally, in the handling of the plates, with the aid of tongs.

3. That the manner in which the plates go through the tinning bath is the most unfavorable imaginable, because the plates coated with liquid tin come into contact with the air three times, the result being the formation of oxide of tin, which renders the plates, and, in the long run, the tinning baths, too, impure.

4. That in this method of rolling, the different parts of the plates remain in the tin different lengths of time, according to whether they are nearer or more distant from the edge, which is first introduced into the tin. This, too, has its influence upon the purity of the coating of tin.

5. That the production of the five-pot tinning hearth is relatively smaller, being only about 30 boxes per 10-hour shift. In spite of these obvious drawbacks, efforts to devise a better method, or a better apparatus capable of furnishing plates as good, have not yet succeeded, although a good deal of pains and money have been spent in the trials. All the tinning hearths at works in England having less than five pots or using tinning machines make only lower grades of plates. In discussing the question of simplifying the present methods it would appear, first of all, as though the brushing-pot might be disposed of, but if the system described is carefully considered it will be found that it is necessary for uninterrupted working of the hearth, because the first pot must be filled while the plates in the brushing-pot are being completed. When that process is completed the plates in the first pot are ready to go to the brushing-pot. In this manner continuous work is procured, each pot and each workman working in the hands of the one following. Since, furthermore, as many as 200 plates are in the first pot at the same time and almost as many stand in the brushing pot, there are always 300 to 400 plates undergoing treatment. Now, as the plates are taken in hand in succession it follows that every plate remains in the tin from 30 to 40 minutes. It is impossible to keep within this limit when there are less than five pots, and in fact that has never been attained in any tinning machine, but the longer the plates remain in contact with the tin the purer will be the tinning, because all particles of steam or grease adhering to the surface of the iron and between particles of oxide of tin are loosened and carried upward. Their complete removal is effected only by the brushing. It is an easy matter to prove that the brushing method, primitive as it may be, is absolutely necessary by comparing brushed and unbrushed plates. The latter, after passing through the pot, has a clearly grained surface, and carries the impression that there are innumerable minute grains under the coating of tin. Brushed plates, however, show this phenomenon to a much lesser degree—less so the more uniformly the work of brushing has been done. It is the suppression of brushing that constitutes the drawback of all plates produced in hearths of modern design, or made in any tinning machine without exception, and which makes it impossible to produce good tin plates. Efforts have vainly been made in such hearths and machines to supplant the brushing by stationary brushes of asbestos or hemp, or by rotary brushing rolls, or by scouring edges attached to springs.

(To be continued.)

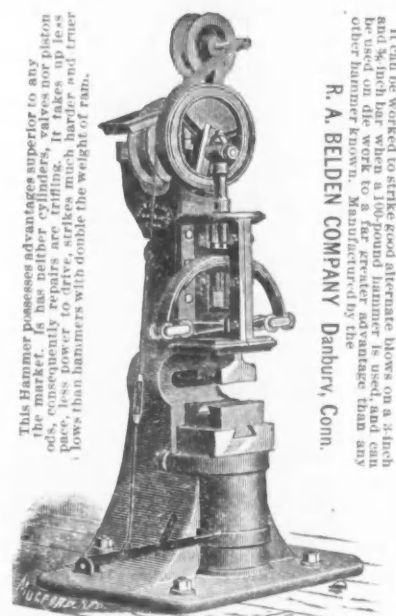
The water bureau in Philadelphia last week awarded contracts for iron pipes as follows: To the Camden Iron Works, 500 lengths of 4 inch pipe, at 1.33 cents per pound; 10,000 lengths of 6 inch pipe, at 1.316 cents; 100 lengths of 8 inch pipe, at 1.312 cents; 100 lengths of 10 inch pipe, at 1.272 cents; 600 lengths of 12 inch pipe, at 1.261 cents; 250 lengths of 18 inch pipe, at 1.15 cents. To the McNeal Pipe and Foundry Company, 50 lengths of 16 inch pipe, at 1.239 cents per pound; 100 lengths of 20 inch pipe, at 1.228 cents; 100 lengths of 30 inch pipe, at 1.195 cents. To the Gloucester Iron Company, 600,000 pounds of small and large specials, at 2 1/2 and 2 3/4 cents per pound. To the Camden Iron Works, 500 pounds of breeches pipe, at 3.73¢.

The firm of Andrews Bros. & Co., owning and operating coal mines, rolling mills and blast furnaces, at Hasleton, near Youngstown, Ohio, have incorporated under the name of the Andrews Bros. Company, with a capital of \$500,000, all paid in. The change was put into effect on the 3d inst. The directors of the company are as follows: Wallace C. Andrews, of New York City, and Chauncey H. Andrews, L. E. Cochran, John A. Logan and James Neilson, of Youngstown. L. E. Cochran is president and treasurer, James Neilson vice-president and Henry W. Heedy, secretary. The branch offices will be retained as before, with the Chicago office in charge of John McLaughlan, 53 Dearborn street.

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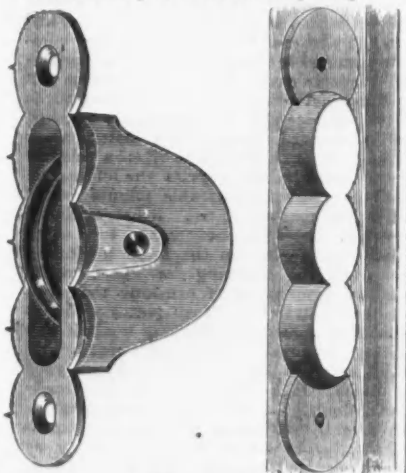
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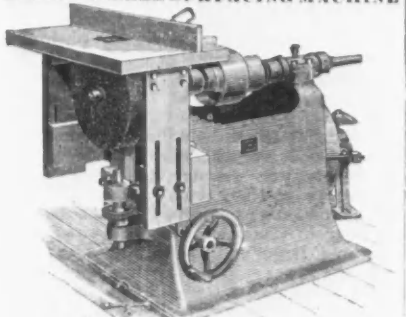
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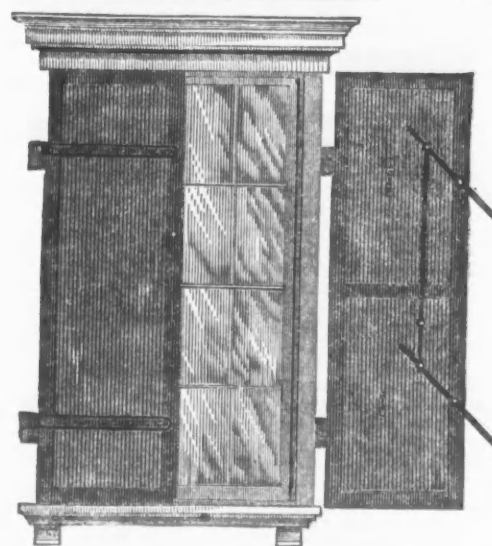
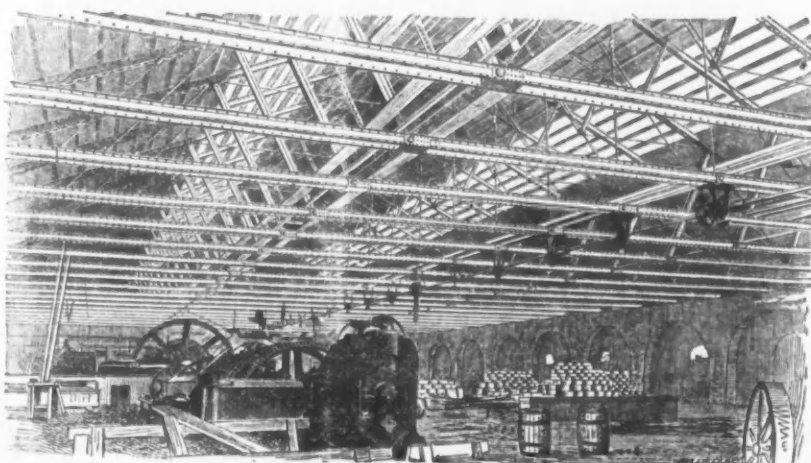
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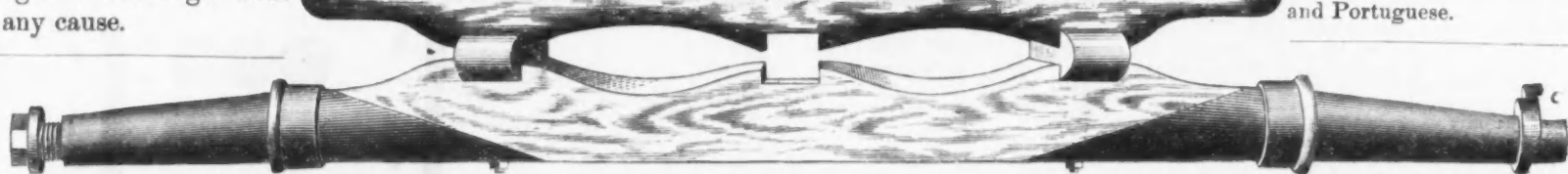
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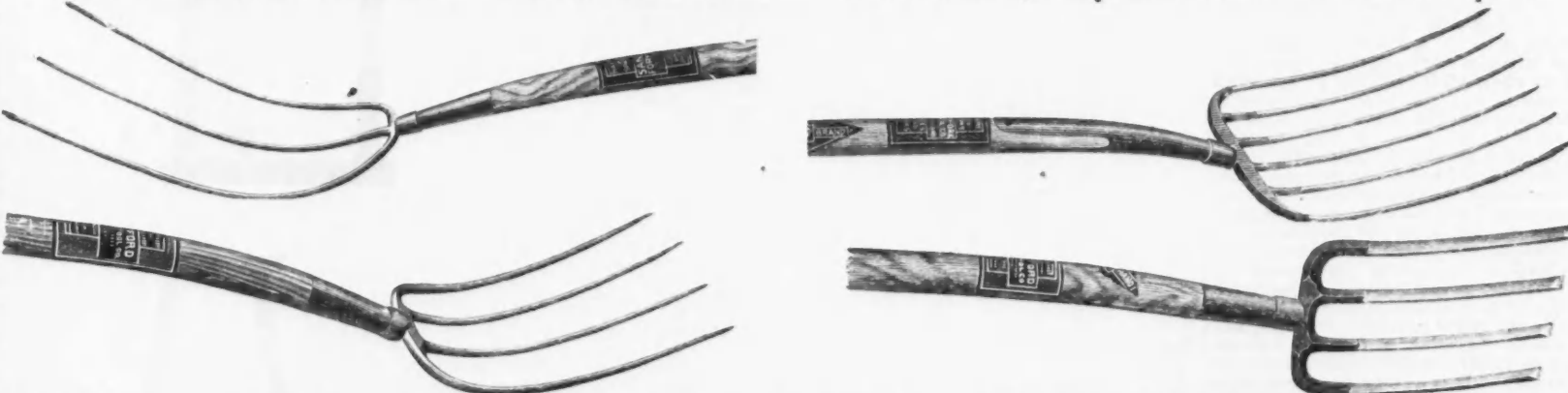
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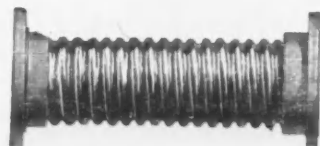
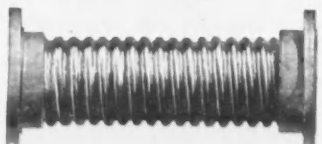
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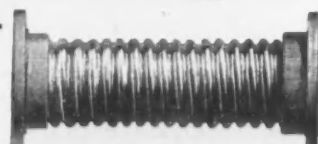
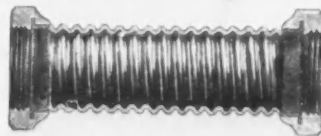
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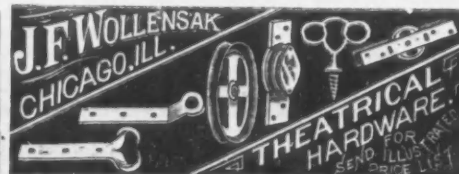
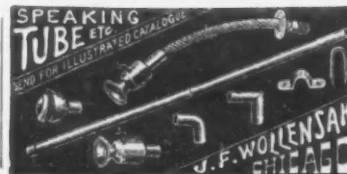
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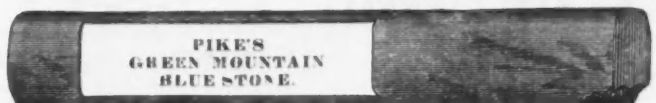
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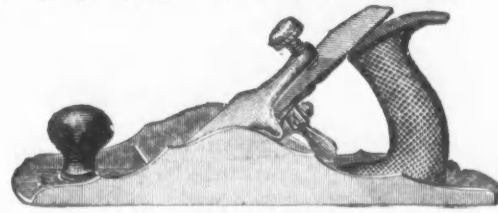
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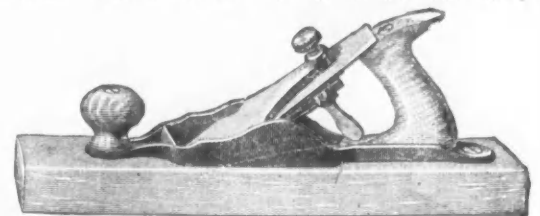
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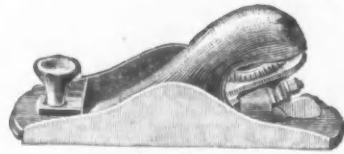
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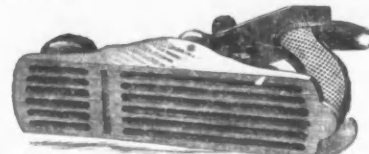
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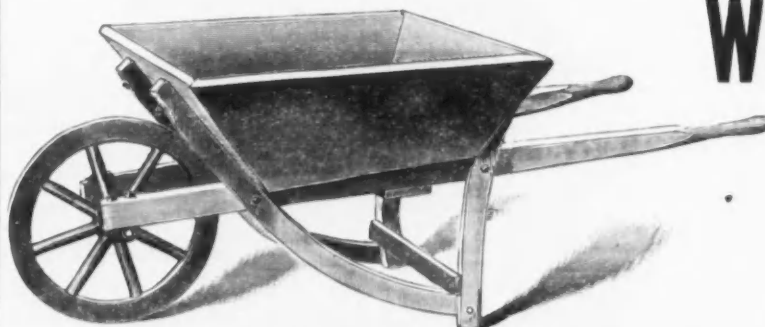
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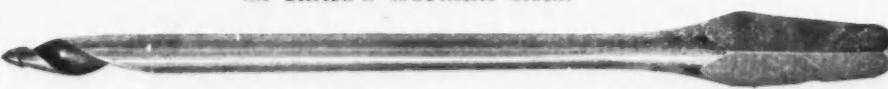
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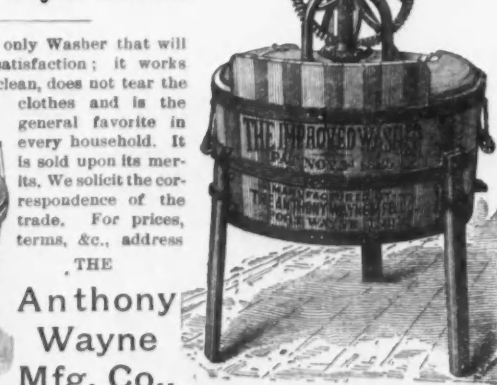
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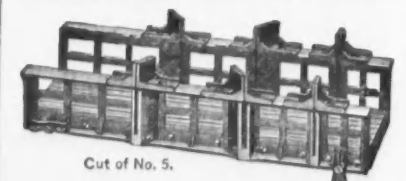


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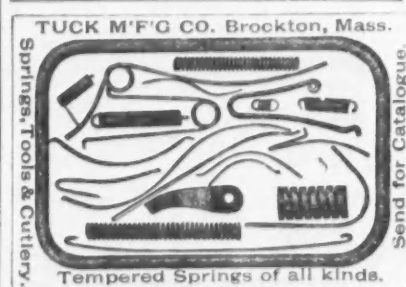
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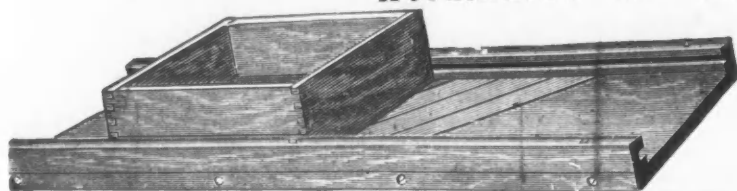


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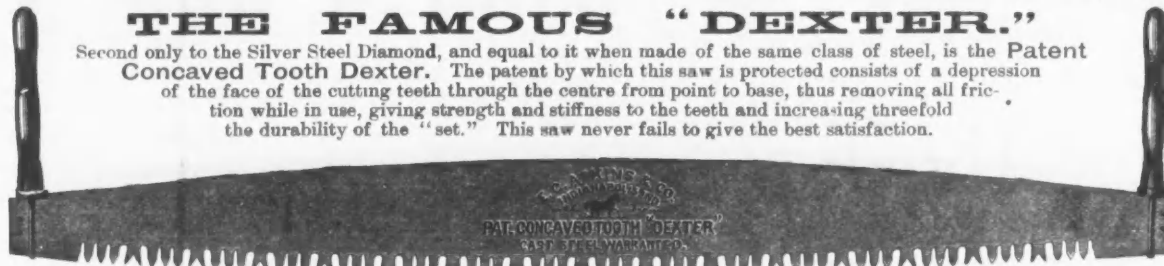
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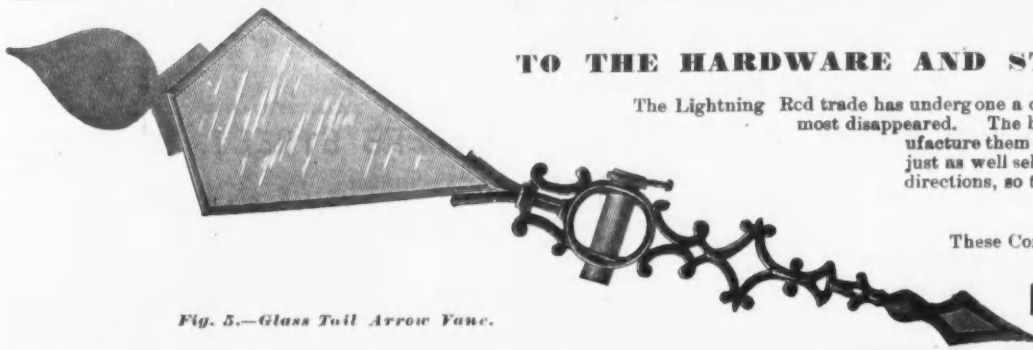


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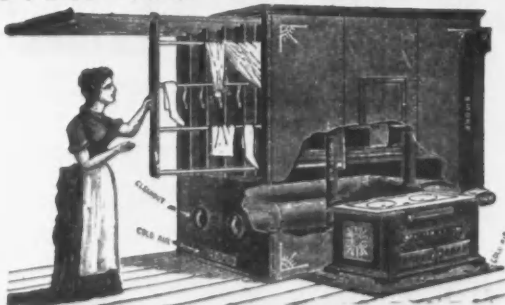
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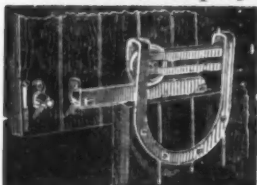
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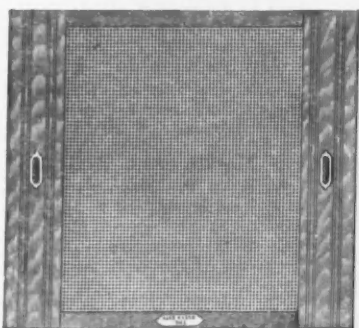
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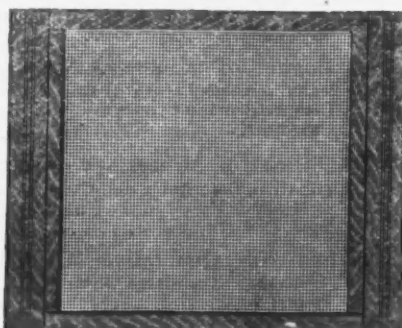
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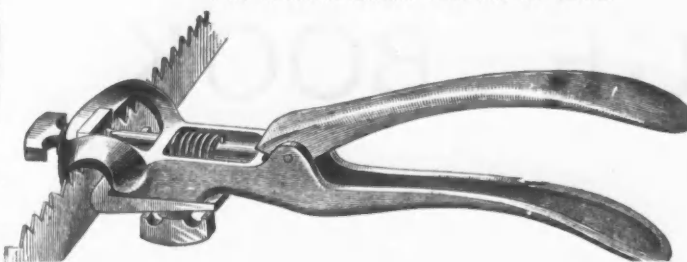
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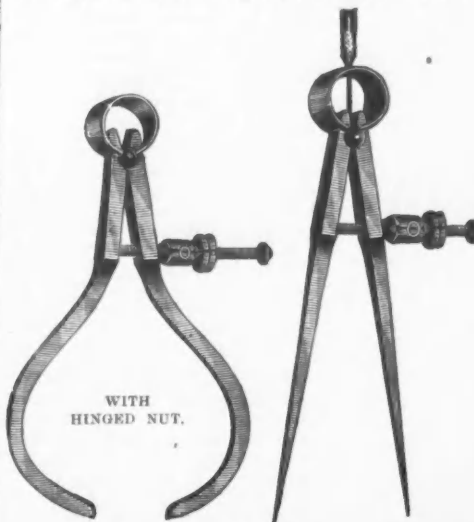


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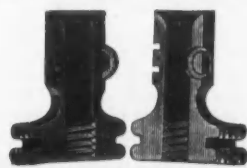


WITH  
HINGED NUT.

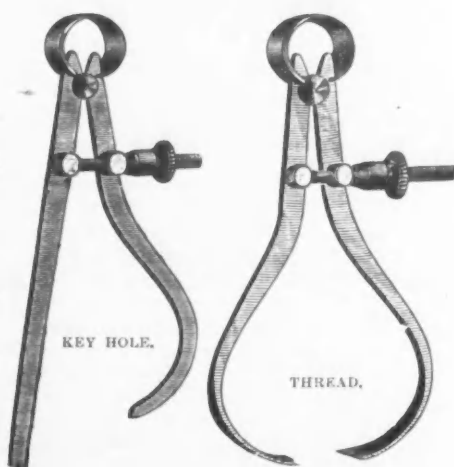


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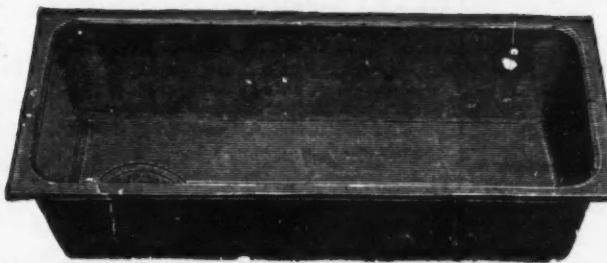
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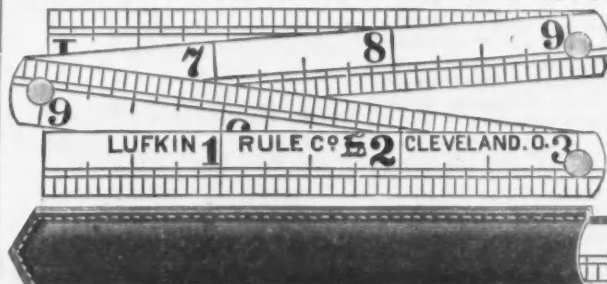
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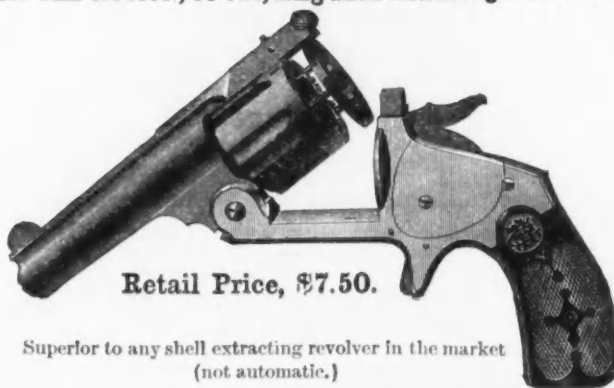
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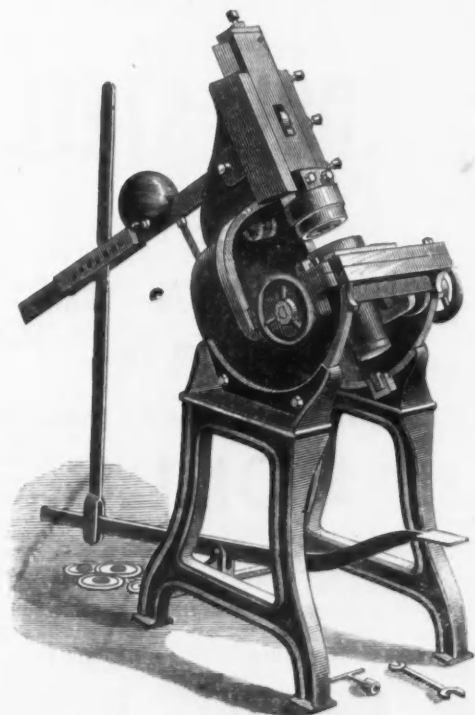
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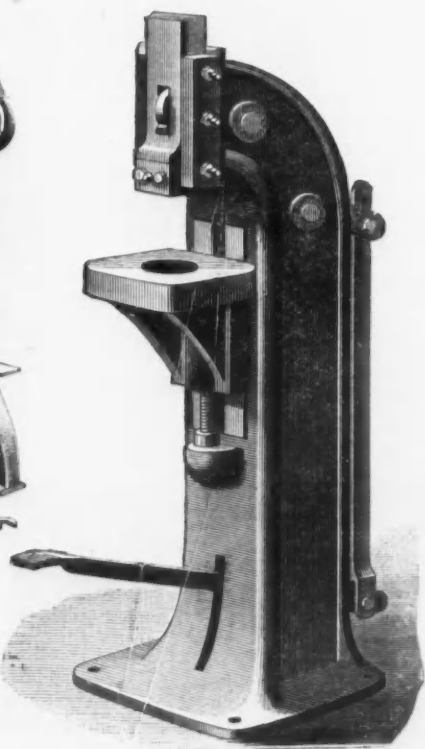
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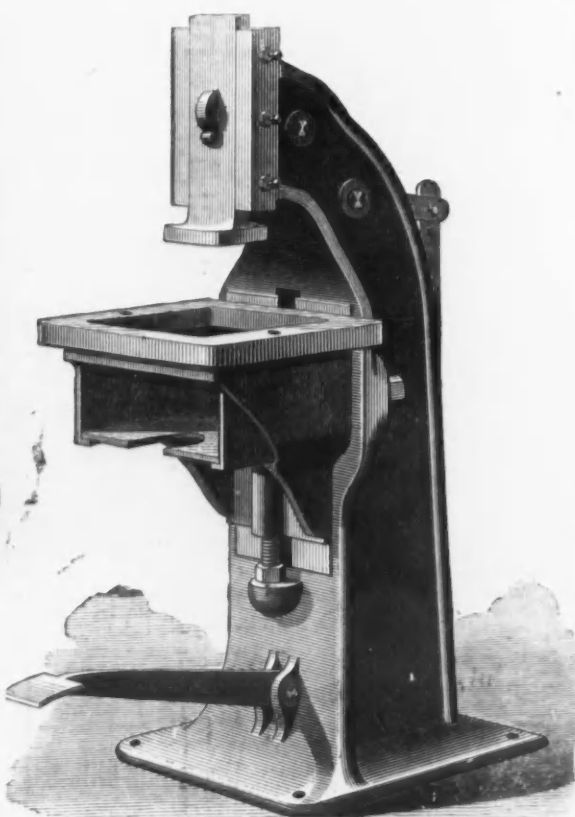
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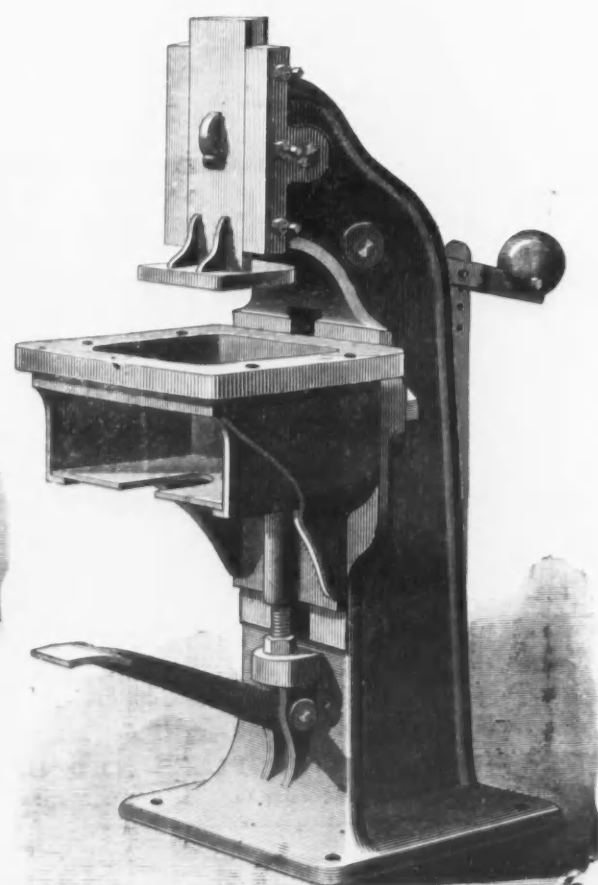
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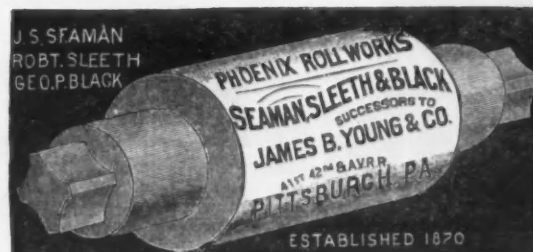
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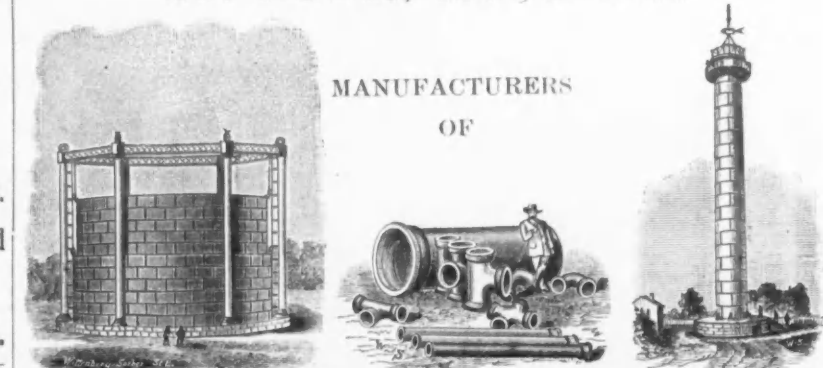
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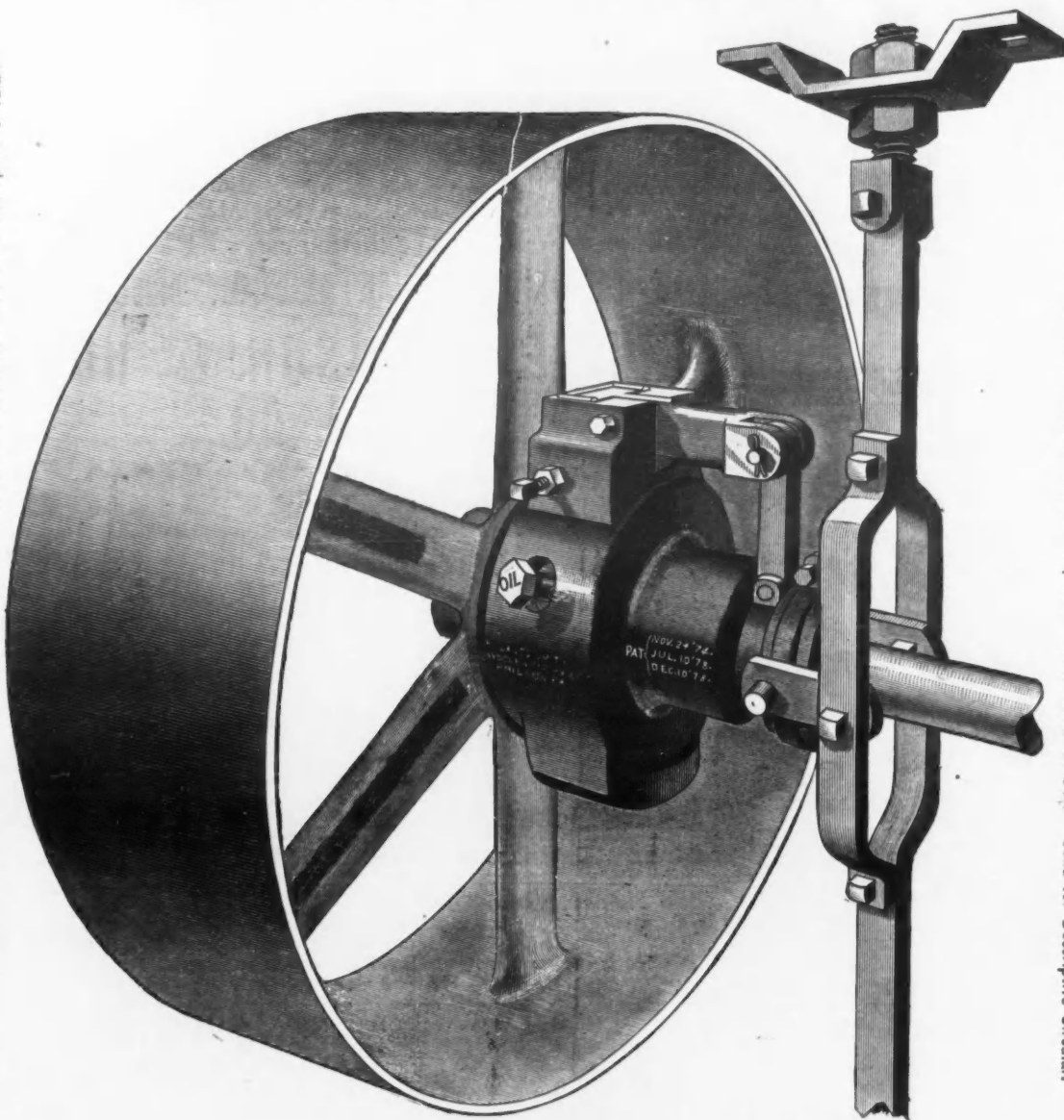
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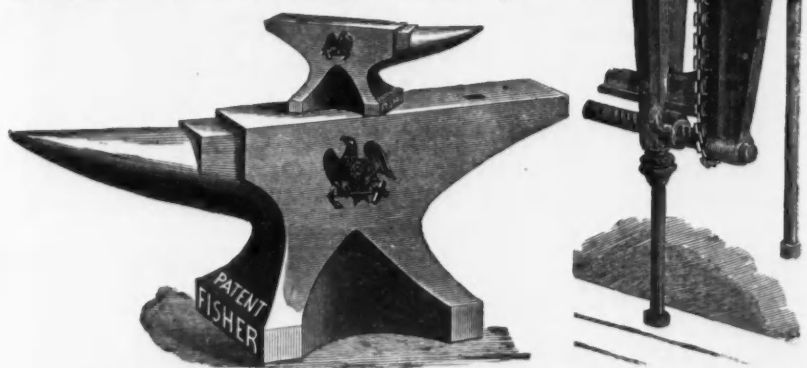
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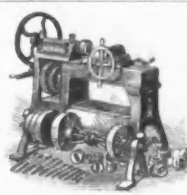


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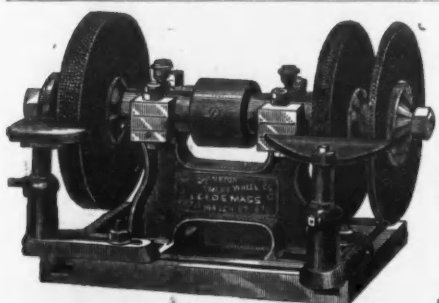
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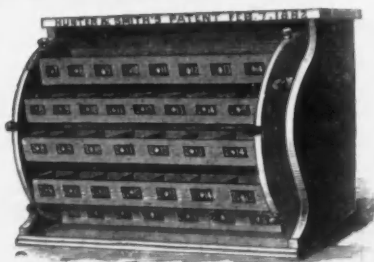
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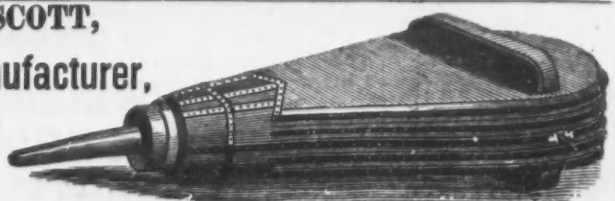
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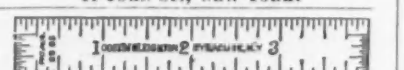


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## HP NAIL CO., CLEVELAND, O. STANDARD PENNY NAILS.

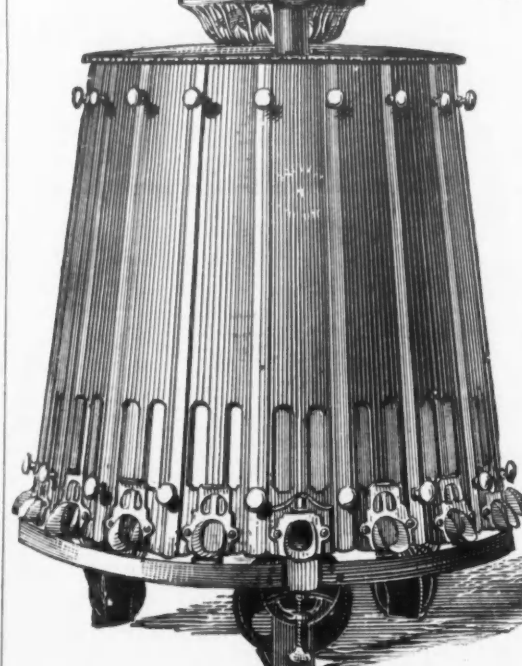
MANUFACTURERS OF

BRADS OR FINISHING NAILS. CAR NAILS. CIGAR BOX NAILS. TIN AND SLATE ROOFING NAILS. WIRE SPIKES FOR TRACK AND DOCK WORK. WIRE TACKS. BLIND AND BED STAPLES AND LINKS. MCGREGOR NAIL BOXES, AND WIRE NAILS OF ALL KINDS, BARBED OR SMOOTH, PLAIN, TINNED OR GALVANIZED.

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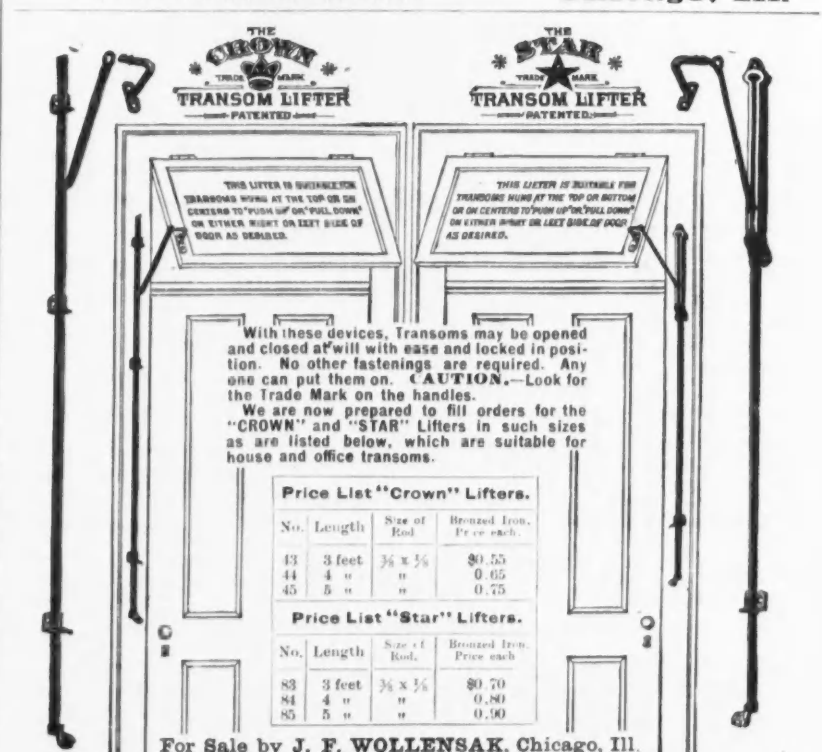
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**Schenck's Adjustable Fire Back Co.**

(SUCCESSORS TO HENRY WESTPHAL)

**94 Market St.,**

**Chicago, Ill.**



**THE CROWN TRANSOM LIFTER**

**THE STAR TRANSOM LIFTER**

PATENTED

PATENTED

THIS LIFTER IS SUITABLE FOR TRANSOMS WORK AT THE TOP OR ON

THIS LIFTER IS SUITABLE FOR TRANSOMS WORK AT THE TOP OR ON

ON EITHER RIGHT OR LEFT SIDE OF

ON EITHER RIGHT OR LEFT SIDE OF

AS DESIRED.

AS DESIRED.

With these devices, Transoms may be opened and closed at will with ease and locked in position. No other fastenings are required. Any one can put them on. CAUTION—Look for the Trade Mark on the handles.

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We are now prepared to fill orders for the "CROWN" and "STAR" Lifters in such sizes as are listed below, which are suitable for house and office transoms.

We are now prepared to fill orders for the "CROWN" and "STAR" Lifters in such sizes as are listed below, which are suitable for house and office transoms.

**Price List "Crown" Lifters.**

**Price List "Star" Lifters.**

No. Length Size of Rod. Price each.

No. Length Size of Rod. Price each.

43 3 feet 3/4 x 3/4 \$0.55

43 3 feet 3/4 x 3/4 \$0.55

44 4 " " 0.65

44 4 " " 0.65

45 5 " " 0.75

45 5 " " 0.75

46 6 " " 0.85

46 6 " " 0.85

47 7 " " 0.95

47 7 " " 0.95

48 8 " " 1.05

48 8 " " 1.05

49 9 " " 1.15

49 9 " " 1.15

50 10 " " 1.25

50 10 " " 1.25

51 11 " " 1.35

51 11 " " 1.35

52 12 " " 1.45

52 12 " " 1.45

53 13 " " 1.55

53 13 " " 1.55

54 14 " " 1.65

54 14 " " 1.65

55 15 " " 1.75

55 15 " " 1.75

56 16 " " 1.85

56 16 " " 1.85

57 17 " " 1.95

57 17 " " 1.95

58 18 " " 2.05

58 18 " " 2.05

59 19 " " 2.15

59 19 " " 2.15

60 20 " " 2.25

60 20 " " 2.25

61 21 " " 2.35

61 21 " " 2.35

62 22 " " 2.45

62 22 " " 2.45

63 23 " " 2.55

63 23 " " 2.55

64 24 " " 2.65

64 24 " " 2.65

65 25 " " 2.75

65 25 " " 2.75

66 26 " " 2.85

66 26 " " 2.85

67 27 " " 2.95

67 27 " " 2.95

68 28 " " 3.05

68 28 " " 3.05

69 29 " " 3.15

69 29 " " 3.15

70 30 " " 3.25

70 30 " " 3.25

71 31 " " 3.35

71 31 " " 3.35

72 32 " " 3.45

72 32 " " 3.45

73 33 " " 3.55

73 33 " " 3.55

74 34 " " 3.65

74 34 " " 3.65

75 35 " " 3.75

75 35 " " 3.75

76 36 " " 3.85

76 36 " " 3.85

77 37 " " 3.95

77 37 " " 3.95

78 38 " " 4.05

78 38 " " 4.05

79 39 " " 4.15

79 39 " " 4.15

80 40 " " 4.25

80 40 " " 4.25

81 41 " " 4.35

81 41 " " 4.35

82 42 " " 4.45

82 42 " " 4.45

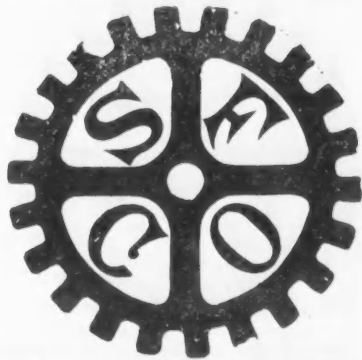


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OF SUPERIOR QUALITY AND FINISH.  
**SMALL IRON CASTINGS,**  
 Warranted Soft, Sound, Smooth, Strong and True to Pattern.  
 Carefully Inspected, Cleaned and Tumbled.

Freight paid to principal points in New England and New York. Correspondence Solicited.

**FINE MACHINERY CASTINGS. HARDWARE SPECIALTIES.**



## MILLIONS OF DOLLARS

are wasted in trying to use **CHEAP AND POOR CASTINGS.** Rough, Hard and Unsound. The machinist spends hours chipping and filing where it should not be necessary, or he is continually breaking or dulling his tools and losing valuable time repairing or grinding them, and perhaps his final operation discovers a fatal blow-hole, and all his previous work goes for naught. Often such castings are made to weigh more than they ought, or are rapped out of shape so they will not fit the jigs. Many buyers forget that in castings as in everything else, *the best is the cheapest!*

**GET THE BEST, from**  
**SPRINGFIELD FOUNDRY CO., 93 Liberty St.,**  
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*Do you use glue?*  
 Improved Steam Glue Heaters  
 without joints, and therefore free from leakage. For use in all cases where glue is required. Made in various sizes to suit different styles of work. Price list on request. **PANCOAST & MAULE**, 245 South Third St., PHILADELPHIA, PA.

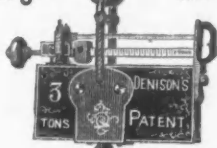


*Do you lack the funds to build your Ornamental Fittings?*  
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 By the use of these FITTINGS very handsome Wall Coils of ONE INCH Wrought Pipe may be built. Painted in some harmonious tint, with the raised ornaments finished in bronze, they produce a very pleasing effect, at a small advance on cost of the plain Fittings commonly used for such work. Manufactured by **PANCOAST & MAULE**, 242 and 245 South Third St., Philadelphia.

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 Fine Light Castings in Large Quantities a Specialty.  
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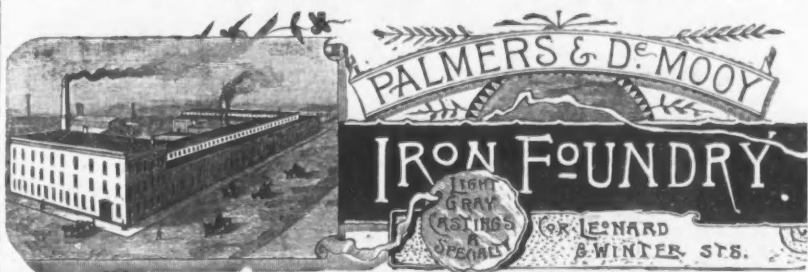
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 Suspended Weighing Machine.  
 No Springs. No Liquids.



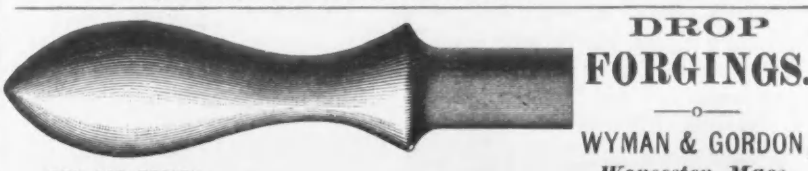
No Uncertainty. No Loose Weights.  
 The only accurate Crane Weighing Machine ever produced

for weighing goods of all kinds during removal from Ships, Canal Boats, Railway Trucks, Warehouses, and also in Iron and Steel Furnaces, as the machines are not liable to injury from the heat. CONSTRUCTED upon the compound lever principle, OF THE BEST FORGED IRON AND STEEL. All the knife edges and bearings are steel, scientifically tempered and hardened.

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 OF LIGHT AND MEDIUM WEIGHT. SOFT, STRONG AND TRUE TO PATTERN. Freight paid to principal points in Middle States and New England.  
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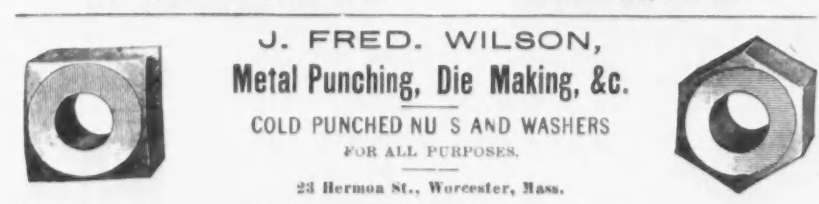
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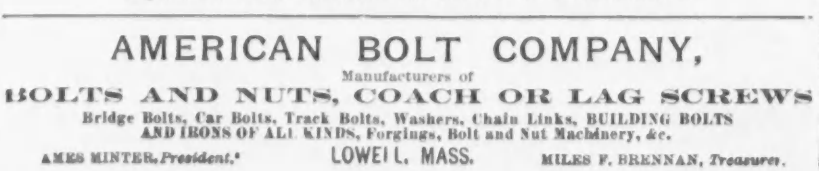
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 COLD PUNCHED NUTS AND WASHERS FOR ALL PURPOSES.  
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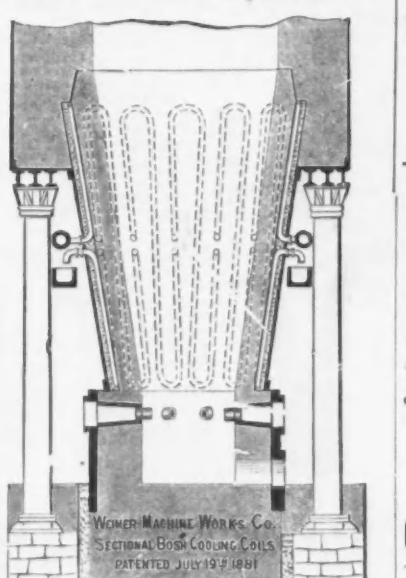


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**SQUARE AND HEXAGON NUTS A SPECIALTY.**  
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DEVOTED EXCLUSIVELY TO  
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**Cast and Malleable Iron Fittings,**  
 For Steam, Gas, Water and Oil.  
 Refined Malleable and Gray Iron  
**CASTINGS TO ORDER.**  
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 OF ALL DESCRIPTIONS.  
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**COLD ROLLED STEEL**  
 FOR PRESS & DROP WORK  
 IN VERY LONG COILS SUITABLE FOR FEEDING AUTOMATIC MACHINES. METALLIC GOODS MADE TO ORDER.  
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**HAIGHT & CLARK,**  
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 MANUFACTURERS OF  
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## CARRIAGE HARDWARE

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## SPECIAL FORGINGS,

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## JACK SCREWS

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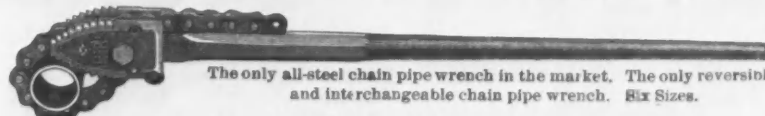
ADJUSTABLE JAW,  
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Adapted to all kinds of Vise Work, also

"PEELLESS" SWIVEL PIPE GRIP  
FITS ANY VISE. SOLD BY THE TRADE.

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23 Day St., New York,  
OLE PROPRIETORS. SEND FOR CIRCULAR.

## BROCK'S PATENT DROP FORGED CHAIN PIPE WRENCH.



The only all-steel chain pipe wrench in the market. The only reversible and interchangeable chain pipe wrench. Six Sizes.

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Drop Forgings of Every Description,

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S. H. KOHN, President.

C. P. HAUGHLIN, Vice-President.

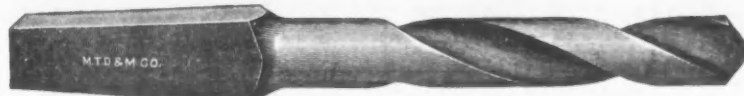
## CHROME STEEL WORKS,

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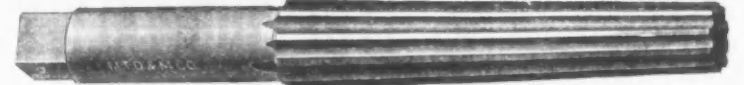
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Milling Cutters,

Beach's Patent Self-Centering Chucks, and Special Tools to Order.



ALL TOOLS EXACT TO WHITWORTH STANDARD GAUGES.

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Sole Sales Agents for THE MORSE TWIST DRILL AND MACHINE CO.'S



Manufacture of Patent Machine Relieved Nut, Hand, Blacksmith and Machine Screw Taps, Screw Plates, Tap Wrenches and Patent Relieved Pipe Taps and Pipe Reamers; also of Solid Bolt and Pipe Dies. Furnished in V, U, S. Standard and Whitworth shape of threads.

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Manufacturers of  
INCREASE TWIST DRILLS, &c.,  
TAPER SHANK DRILLS,  
Straight Shank Drills,  
Machine Bit Drills,  
Screw Driver Bits,  
BIT STOCK  
Drills

SOCKETS,

Hand and  
Shell Reamers,  
Standard Gauges, Milling  
Cutters and Special Tools,  
Morse Taper Reamers,

Standard Patent

TWIST DRILL GRINDING MACHINE.  
New York Office, 33 Chambers Street.



Established in 1874.

CLEVELAND TWIST DRILL COMPANY.

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OTIS & BROWN, 154 Lake St., Chicago

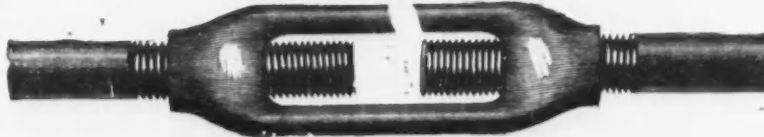
## NEW PROCESS TWIST DRILL CO., MANUFACTURERS OF Hot Forged Straight Lip Increase Twist Drills



Drills of any size or length, with Straight or Taper Shanks, made to order and to fit any socket desired.  
SEND FOR CATALOGUE AND PRICE LIST.  
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ESTABLISHED 1867.

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Presses, &c. Patent Double  
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Gear Cutting a specialty.

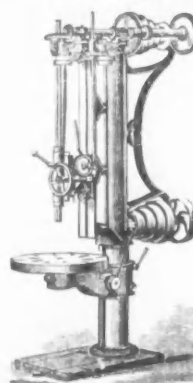


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Send for new Catalogue of Specialties.

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Box's Pat. Double

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13,000 in use.

Many have done bar

continuous duty 5 years

without a single part

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have built up a reputation

themselves that cannot be

approached. Our improved

Radial Drills

are also assuming the same

standard.

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Portable Hoist,

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Advantages claimed.

1st. Being made with

Spur Gears and at

the same time sus-

taining the load at

any point.

2d. One man of ordi-

nary strength is capa-

ble of raising the

load for which each

hoist is built.

3d. The ability of rap-

idly raising or

lowering the empty

hook by pulling on

the lift-chain, in-

stead of the slow and

tedious process by

the hand chain.

4th. Being provided

with self-oilers is

always lubricated,

which adds both to

the ease of lifting and

the life of the hoist.

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NEW AND SECOND HAND.

Lathes, Planes, Drill Presses,  
Shapers, Milling Machines, Gear  
Cutters.

WRITE FOR ESTIMATES ON MACHINES WANTED.

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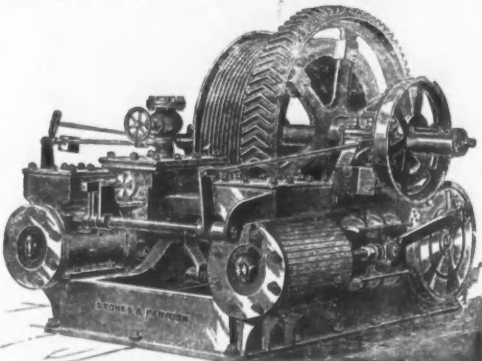
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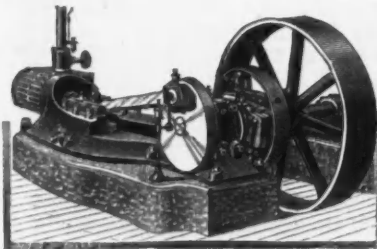
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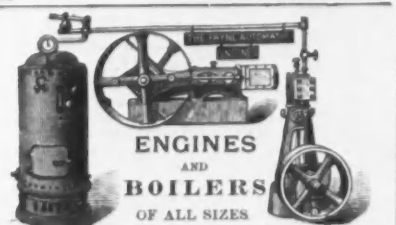
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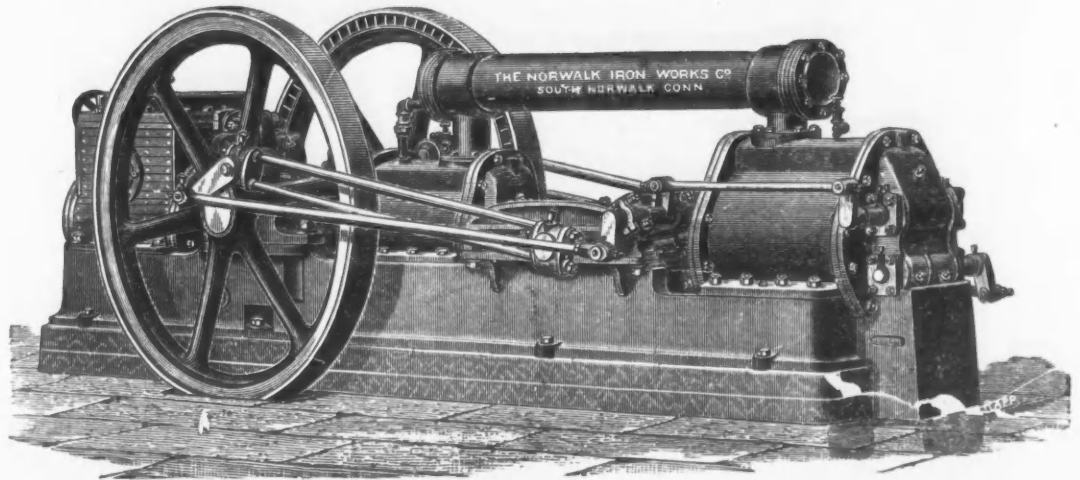
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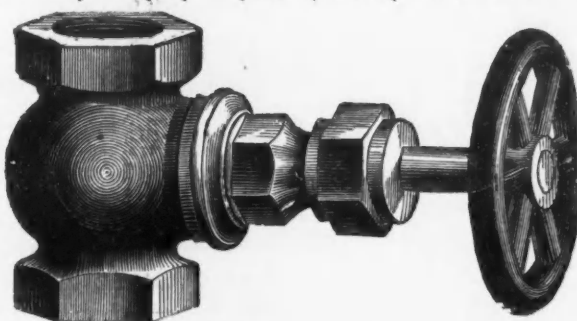


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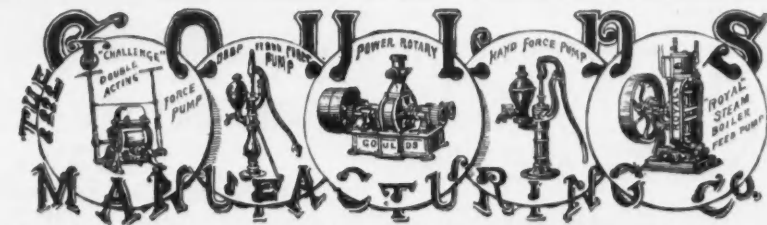
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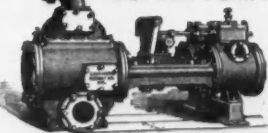
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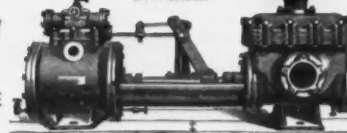
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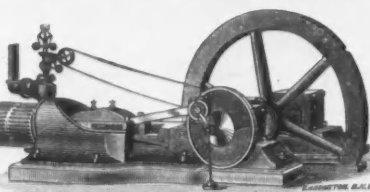
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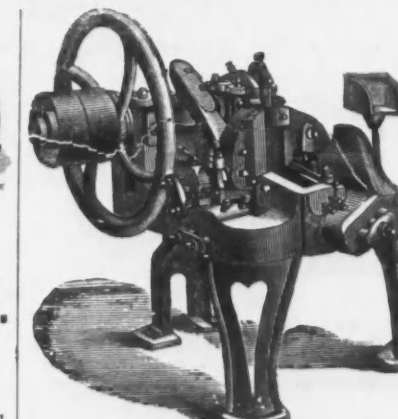
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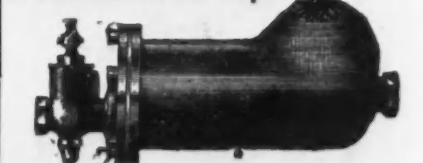
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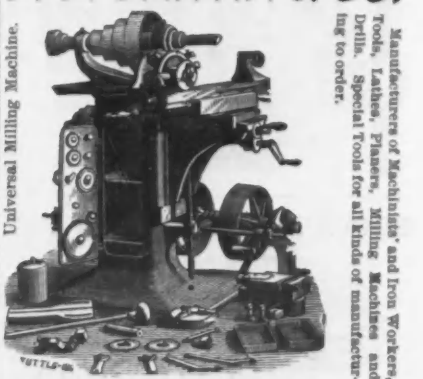
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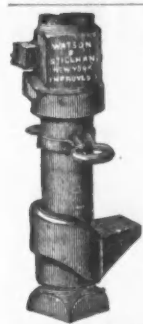


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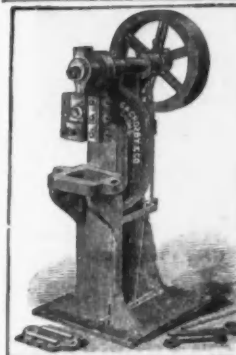
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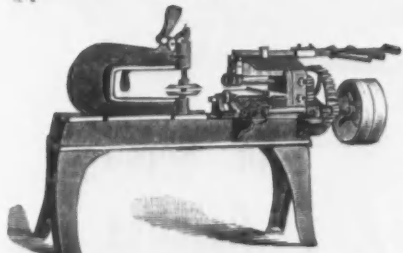
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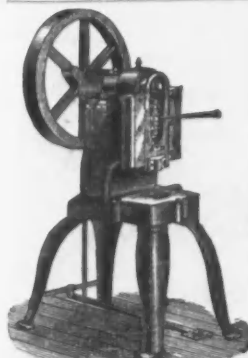
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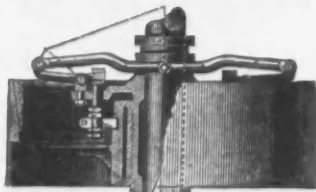


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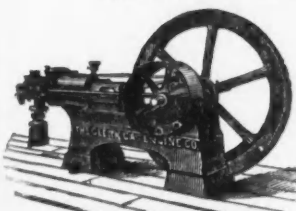
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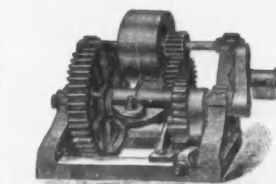
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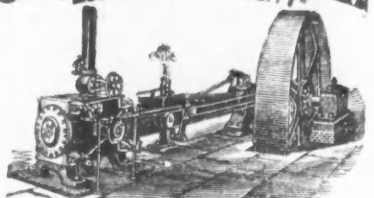
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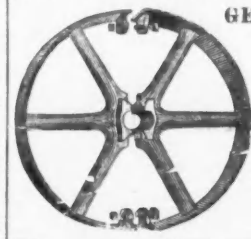
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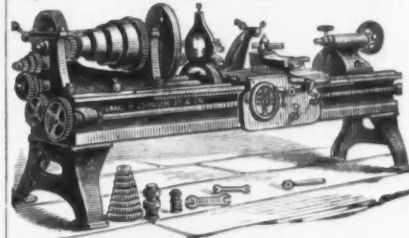
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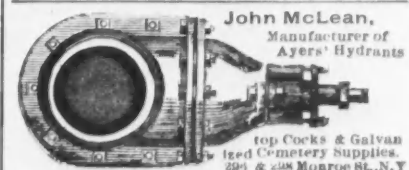
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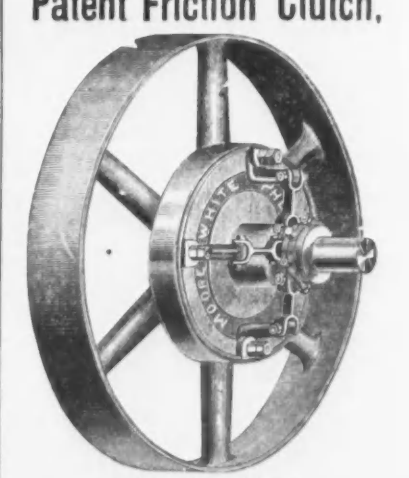
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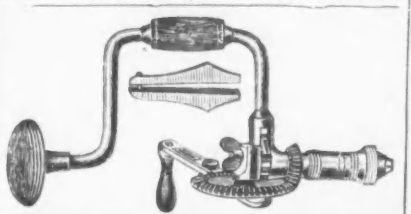
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